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Marine Fisheries Abstracts

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Marine Fisheries Abstracts

UNITED STATES DEPARTMENT OF COMMERCE

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NATIONAL MARINE FISHERIES SERVICE

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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Marine Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.11 (9.11) MARINE SCIENCES INSTRUMENTATION. VOLUME 5

Chase, L. (editor)
Published by Instrument Society of America, 400 Stanwix St., Pittsburgh, PA 15222 (1973), 46 pp.

The following papers were delivered at the Proceedings of the Fifth National ISA Marine Sciences Instrumentation Symposium held in Cocoa Beach, Fla., Jan 31 to Feb. 2, 1973.

"Low Cost or High Reliability--the Manufacturer's Dilemma," by R. L. Adams (pp. 1-2); "Field Instrumentation: A Product of Desirements or Requirements," by T. G. Hetu (pp. 3-9); "The STD [salinity, temperature, depth measuring system]--Its Use and Misuse," by J. E. Jaeger (pp. 9-14); "Sensor System Programs for the National Data Buoy Center," by R. H. Cassis, Jr. (pp. 15-18); "Gate--Instrumenting a New Program in Oceanic Science," by R. G. Williams (pp. 19-28); "Instrumentation for Polar Oceanography," by D. J. Baker, Jr. (pp. 29-32); "Instrumentation Need for Oceanic Monitoring, Assessment and Prediction," by R. C. Landis (pp. 33-40); and "Oceanographic Instrumentation Prospects," by J. Williams (pp. 41-44). SW

0.34 (6.3) ZONAROL AND ISOZONAROL, FUNGITOXIC HYDROQUINONES FROM THE BROWN SEAWEED DICTYOPTERIS ZONARIOIDES

Fenical, William (Institute of Marine Resources, Scripps Institution of Oceanography, La Jolla, CA 92037), James J. Sims, Delilah Squatrito, Richard M. Wing, and Phillip Radlick
Journal of Organic Chemistry 38, No. 13, 2383-2386 (1973)

In this paper the authors describe the structure of zonarol and isozonarol, isomeric C_{21} hydroquinones, obtained by methanol extraction of D. zonarioides. The samples of alga were collected in the Pacific Ocean and in the Gulf of California. Both quinones are moderately fungitoxic toward Phytophthora cinnamomi, Rhizoctonia solani, Sclerotinia scleortiorum, and Sclerotium rolfsii.
[17 references] FTP

0.39 IN VITRO EFFECTS OF PROLACTIN AND CORTISOL ON WATER PERMEABILITY OF THE URINARY BLADDER OF THE TELEOST GILLICHTHYS MIRABILIS

Doneen, Byron A., and Howard A. Bern (Dept. of Zoology and Cancer Research Laboratory, University of California, Berkeley, CA 94720)
Journal of Experimental Zoology 187, No. 1, 173-179 (Jan. 1974)

Prolactin [a hormone of pituitary origin] not only is responsible for lactogenesis in the mammary gland but also has osmoregulatory action in fish gill, intestine, and kidney. A report from another worker indicates that the hormone reduces the permeability of the urinary bladder of some marine fishes adapted to freshwater. Prolactin is considered to be important in the adjustment of marine fish to freshwater. Cortisol [a hormone originating in the adrenal cortex] has been reported to be important in the adaptation of marine-living fish to seawater, and has also been reported to antagonize the action of prolactin in decreasing the permeability of the bladder of starry flounder acclimated to 133% seawater. Because prolactin and cortisol are antagonistic, results of experiments in which prolactin is given to intact seawater animals may be complicated by the contrary effects of internally secreted cortisol. To provide for studies of bladder membrane function under conditions which permit complete definition of the hormonal environment, bladders from G. mirabilis were maintained in tissue culture conditions. The effects on osmotic permeability coefficient (P_{os}) of the bladders were measured after culture with prolactin, cortisol, serum albumin, insulin, and prolactin-producing cells of pituitary glands from Tilapia mossambica and 5% seawater-adapted G. mirabilis.

0.39 (0.4) EFFECTS OF ETHANOL ON MEMBRANE LIPIDS. III. QUANTITATIVE CHANGES IN LIPID AND FATTY ACID COMPOSITION OF NONPOLAR AND POLAR LIPIDS OF MOUSE TOTAL LIVER, MITOCHONDRIA AND MICROSOMES FOLLOWING ETHANOL FEEDING

Miceli, Joseph N., and William J. Ferrell (address correspondence to W. J. Ferrell; Dept. of Pathology, University of Michigan, Ann Arbor, MI 48104)
Lipids 8, No. 12, 722-727 (Dec. 1973)

Earlier reports indicated (1) that the size and number of rat liver mitochondria were affected by ethanol, and (2) changes in fatty acid composition of lipids were associated with membrane stability. The authors suggest that ethanol may have an effect on membrane structure and function, and this effect may be due to changes in lipid composition. In this study the effects of ethanol consumption on liver lipid composition in mice were reported.

Mice were maintained for 21 days on ethanol. Subcellular fractions of liver tissue were prepared and histological comparisons between sections of liver from control and mice fed ethanol were made. Safranin and Sudan Black stains of liver sections indicated that the mice fed ethanol did not have fatty livers.

Results of the analysis of the liver subcellular fractions show that the ethanol fed mice had 12.8% more lipid in the total liver than the controls; this increase was due to an increase in nonpolar lipids (NPL) which exceeded an accompanying loss of polar lipids (PL). Liver mitochondria showed a loss of 23.4% total lipid; this was also due to a loss of PL. Microsomes showed a loss of lipid of 25.1% and was due to losses of NPL and PL. In the total liver, the increase in

0.35 FORMATION OF DIMETHYLNITROSAMINE FROM DIMETHYLAMINE AND TRIMETHYLAMINE AT ELEVATED TEMPERATURES

Scanlan, Richard A. (Dept. of Food Science and Technology, Oregon State University, Corvallis, OR 97331), Sandra M. Lohsen, Donald D. Bills, and Leonard M. Libbey
Journal of Agricultural and Food Chemistry 22, No. 1, 149-150 (Jan.-Feb. 1974)

Different levels of dimethylamine (DMA) and of trimethylamine (TMA) were reacted with sodium nitrite at pH 6.4, 100° C, and for 2.5 h. At equimolar levels of the amines and sodium nitrite, more dimethylnitrosamine (DMNA) was produced from DMA than from TMA. When the molar ratio of the amines to sodium nitrite was increased, the amounts of DMNA from DMA and TMA were nearly equal; at high ratios of amines to sodium nitrite, more DMNA was formed from TMA than from the equimolar level of DMA. Formation of DMNA from TMA at 100° C was pH dependent, and the optimum pH was 3.2-3.3.
[2 figures, 2 tables, 14 references] FTP

0.39 (0.4)

NPL was due mostly to cholesterol esters which increased 300%. In the lipid composition, the amount of arachidonic (20:4) and docosahexaenoic (22:6) acids (polyunsaturated) decreased in the total liver, mitochondria, and microsomes of the ethanol-treated mice, except in the choline phosphoglyceride (a lipid) in the mitochondria) where 20:4 acid increased. The authors suggest that the decrease in polyunsaturated fatty acids in liver lipids of mice fed ethanol is due to increased enzyme activity. These results confirm a previous report which showed that the fatty acyl-CoA:lysophosphatide transferases activity is enhanced by ethanol to catalyze the redistrubition of the fatty acids in phospholipids after the nitrogenous base has been attached. Decreases also occurred in the ratios of arachidonate/linoleate of liver lipids following ethanol feeding. These decreases are attributed to decreases in the activity of the enzymes of the chain elongation-desaturation system which converts linoleate to arachidonate.
[6 tables, 27 references] SW

0.31 (1.959) MOLECULAR SPECIES OF WAX ESTERS IN JAW FAT OF ATLANTIC BOTTLENOSE DOLPHIN, TURSIOPS TRUNCATUS

Ackman, R. G., J. C. Sipos, and C. A. Eaton (Environment Canada, Fisheries and Marine Service, Halifax Laboratory, Halifax, Nova Scotia, Canada), B. L. Hilaman, and Carter Litchfield
Lipids 8, No. 12, 661-667 (Dec. 1973)

A series of investigations has been performed by several of the authors to determine if the unusual chemical composition of the head fats of the toothed whales is related to their function in echolocation. In this study, the wax esters from the jaw fat of the bottlenose dolphin were analyzed using gas-liquid chromatography (GLC). The separation of lipid classes was carried out using thin-layer chromatography. The amount of each lipid class, present after it was separated and identified, was measured by IR spectroscopy. The acids from the short chain wax esters were converted to butyl esters and the alcohols into alcohol acetates. The butyl esters upon GLC analysis corresponded to isobutyric, isovaleric, and 2-methylbutyl acids. GLC of the alcohol acetates gave a mixture that consisted of 87.2% saturated C_{14}-C_{18} alcohols including 34.2% iso alcohols. GLC analysis of the long chain wax ester derived fatty acid methyl esters and fatty alcohol acetates closely resembled those found in the short chain wax esters. The mixture contained 73.8% saturated fatty acids including 24.2% iso acids, and 25.7% monoene (monounsaturated) fatty acids. Almost no polyunsaturated fatty acids were present. More details of the structures and yields of the fatty acids and alcohols derived from the jaw fat wax esters are shown in the tables in the article.
[3 tables, 27 references] SW

0.39

Results of the experiments indicate that bladders cultured with cortisol alone showed a higher P_{os} than bladders cultured with cortisol and prolactin. Bladders cultured in the absence of hormones or in the presence of insulin alone showed a P_{os} as low as that after culture with prolactin and cortisol. Based upon these results, the authors suggest that the effects of prolactin and cortisol in vitro on P_{os} duplicates the effects of these hormones in vivo. Furthermore, the results of these experiments may provide a useful system for investigating the hormonal control of renal function in marine fishes. The mode of action of these hormones on the fish system may contribute to a basic understanding of their actions on mammary gland epithelium involving water and solute movements.
[2 figures, 13 references] SW

0.35 CARRAGEENANS AND ANTIPEPTIC ACTIVITY (6.35)
Le Blond, J., Mrs. J. Denis, and B. Flouvat (Lab. "Daniel-Brunet", Boulogne-sur-Seine, France)
Chemical Abstracts 80, No. 3, 10244y (Jan. 21, 1974)

0.4 THE CHEMICAL FORM AND BODILY DISTRIBUTION OF MERCURY IN MARINE FISH

Suzuki, Tsuguyoshi (Dept. of Public Health, Tohoku University School of Medicine, Sendai, Japan), Tomoyo Miyama, and Chiharu Toyama
Bulletin of Environmental Contamination and Toxicology 10, No. 6, 347-355 (Dec. 1973)

The purpose of this study was to determine the chemical forms (inorganic or organic) of mercury in fish and their distribution in the tissues of fish. Thirteen species of fish caught in the South China Sea, the Japan Sea, and off northwestern Australia were tested. Analyses were made for total mercury content and for inorganic mercury content; organic mercury content was estimated as the difference between inorganic and total mercury content. The mercury contents of the gastric system of 10 of the fishes were determined. Some of the data are presented in the table that follows.
[2 figures, 3 tables, 14 references] FTP

Organs and material	Inorganic mercury (mean)	Total mercury (mean)	Inorganic Hg content of organ and material (mean)
	µg/g	µg/g	%
Muscle	0.006	0.197	5.2
Liver	0.267	0.862	34.8
Brain	0.015	0.662	15.7
Kidney	0.247	0.720	32.7
Gastric content	0.030	0.072	43.7

0.7 FIBER. THE FORGOTTEN NUTRIENT
(0.4)

Scala, James (Thomas J. Lipton, Inc., 800 Sylvan Ave., Englewood Cliffs, NJ 07632)
Food Technology 28, No. 1, 34-36 (Jan. 1974)

The author discusses the potential role of dietary fiber in helping to deal with atherosclerosis, diverticulitis, and cancers. Available information on dietary fiber does not permit assignment of a nutritional requirement as is done with vitamins. However, a substantial increase in our dietary fiber probably would be beneficial; perhaps someday a recommended daily allowance for fiber might be proposed. Supplementation of foods with fiber represents a consideration in the future.
[20 references] FTP

0.7 NUTRITIONAL ASPECTS OF NUTRIENT STANDARD MENUS

Jansen, G. Richard, and Judson M. Harper (Colorado State University, Fort Collins, CO 80521)
Food Technology 28, No. 1, 62-64, 66-67 (Jan. 1974)

Planning menus based on a nutrient standard are referred to as nutrient standard menus (NSM). In earlier reports the authors discussed the concept and methodology of computer-assisted menu planning and demonstrated, in a study involving 60 schools, that NSM methods are fully workable and result in menus nutritionally equal or superior to Type A menus. In the present article, the authors discuss nutrient standard menu planning methods from a nutritional standpoint. Problems related to the availability of the required food composition data, selecting a nutrient standard, and establishing the basis for meeting the standard are discussed.
[2 tables, 29 references] FTP

0.7 SYMPOSIUM: DEVELOPING FOODS FOR THE CARDIAC-CONCERNED
(0.4)

Livingston, G. E.; George Christakis; Walter H. Meyer; Sam R. Hoover; R. E. Bowen, E. J. Reid, and R. J. Moshy; Aaron M. Altschul; Clifford J. Robertson; Paul F. Hopper; Ogden C. Johnson; and Frederick J. Stare
Food Technology 28, No. 1, 16-17, 20, 22, 24, 26, 28, 30, 32 (Jan. 1974)

These articles are summaries of the papers on the subject [symposium] presented at the 33d Annual Meeting of the Institute of Food Technologists, Miami Beach, Fla., June 10-30, 1973. The complete papers will be published in Preventive Medicine, available from the American Health Foundation, 1370 Avenue of the Americas, New York, NY 10019 for $5.00 (postage paid). The topics covered in the symposium consisted of: The prudent diet, designing a new American nutritional pattern, economic considerations in making dietary changes, decreasing the fatty acid content of animal products, formulating foods for the cardiac-concerned, vegetable proteins in the prudent diet, prudent diet foods in the food service industry, the regulatory climate for prudent diet foods, regulations affecting prudent diet foods, and recommendations for food industry action. FTP

0.6 CULTIVATION OF MICRO-ORGANISMS ON HYDROCARBONS
(0.5)(2.06)
(6.50)

Leathern, William W.; assignor to Gulf Research & Development Co., Pittsburgh, Pa., U.S.A. (pat.)
Canadian Patent 937,182
Canadian Patent Office Record 101, No. 47, 3714 (Nov. 20, 1973)

Protein concentrates are obtained by cultivating a hydrocarbon-consuming microorganism in the presence of aqueous nutrient medium, a hydrocarbon, and a gas containing free oxygen. FTP

0.7 HANDBOOK NO. 8 AND NUTRITION LABELING
(9.3)

Daniels, Richard W. (Woodward Research Corp., 12310 Pinecrest Rd., Herndon, VA 22070)
Food Technology 28, No. 1, 46-47, 60 (Jan. 1974)

Comparison is made between the results obtained by the author and those reported in Handbook No. 8 on the ascorbic acid content of garden-fresh, market-fresh, frozen, and canned vegetables. The author's data showed excellent agreement with those in the handbook for ascorbic acid content of frozen vegetables and of canned vegetables. Nevertheless, the data obtained were highly variable, and these results may be due to differences in production procedures from company to company.

For the fresh vegetables, the author's data on ascorbic acid content did not agree with those in the handbook. The values in the handbook are for a combination of freshly harvested and market-fresh samples, rather than exclusively market-fresh samples. The author's data were for garden-fresh and market-fresh samples. Major geographic shifts in the production sites of vegetables may account in part for the differences in the results obtained on the ascorbic acid content.

Thus, the handbook should be used as a guide for improving production methods rather than a source of data for nutrition labeling.

Handbook No. 8 is entitled "Composition of Foods -- Raw, Processed, Prepared," prepared by the Consumer and Food Economics Research Division, ARS, U.S. Dept. of Agriculture. It is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. FTP

0.4 REEF CORALS AND CORAL REEFS IN THE VICINITY OF PORT MORESBY, SOUTH COAST OF PAPUA NEW GUINEA
(9.1)

Weber, Jon N. (Dept. of Geology and Geophysics, Pennsylvania State University, 303 Deike Bldg., University Park, PA 16802)
Pacific Science 27, No. 4, 377-390 (Oct. 1973)

Coral reefs along the south coast of Papua near Port Moresby are well developed and rank among the most impressive in the world. These reefs support a rich and diverse coral fauna. The coastal coral reefs are well developed, but coral reefs within the lagoon are almost absent. Sediments covering the lagoon floor are composed of carbonate skeletal detritus in the form of coarse-grained sand. The bulk of the material appears to be derived from skeletons of foraminifera and mollusks. A favorable environment for prolific coral growth is probably created by the combination of strong winds blowing mostly from the southeast, powerful tide generated currents, and circulation of oceanic surface water. As a result of the water movements, the area should be adequately supplied with nutrients and diverse coral planulae (larvae) from the Coral Sea. Additional factors for promoting coral growth are the high mean annual water temperature (28.4° C) and the availability of hard substrate suitable for coral colonization. The reef development has not been affected by recent seismic activity, although few earthquakes originate in this area. In addition to the diversity of the fauna, the reef corals of Port Moresby exhibit enormous, spectacular growth forms of some species. Lobphyllia was observed with shapes that were up to 3 m across. A list of coral genera and subgenera collected from reefs in the Port Moresby area is given.
[11 figures, 2 tables, 11 references] SW

0.7 "NEWER" TRACE ELEMENTS IN HUMAN NUTRITION
(0.4)

Nielsen, F. H. (Human Nutrition Laboratory, U.S. Dept. of Agriculture, P.O. Box D, University Station, Grand Forks, ND 58201)
Food Technology 28, No. 1, 38-40, 42, 44 (Jan. 1974)

Recent research indicates that trace amounts of nickel, vanadium, silicon, and tin are essential and fluorine may be essential for animals. Whether or not they are essential for man has yet to be determined; however, extrapolation of the data indicates that these elements may be. The author suggests, therefore, that inclusion of reasonable amounts of these elements in food analogs and refined foods may be desirable. Some data are given on the levels of vanadium, nickel, silicon, fluorine, and tin in 15 selected fresh foods.
[3 tables, 36 references] FTP

0.4 GENERAL ANESTHESIA OF FISHES

Hadzovic, Safet (Dep. Pharmacol. Toxicol., Vet. Fac., Sarajevo, Yugoslavia)
Chemical Abstracts 80, No. 3, 10142p (Jan. 21, 1974)

0.6 FOOD GELS CONTAINING A FAT
(6.34)

Nizane, Hichiro (pat.)
Japan. 73 14,064 (May 2, 1973)
Chemical Abstracts 80, No. 3, 13833a (Jan. 21, 1974)

0.8 STUDIES ON THE STRESS CRACKING OF STEEL BY HYDROGEN SULFIDE

Kim, Suk-ho
Bulletin of Pusan Fisheries College (Natural Sciences) 13, No. 1, 57-61 (June 1973) [In Korean, English abstract]

Experiments were performed on the delayed failure of various steels immersed in 0.5% acetic acid solution saturated with hydrogen sulfide gas at room temperature. Mild steel, hard steel (high carbon), stainless steel, and high tension steel (60 kg/mm^2 tensile strength) were tested. The test consisted of exerting a variety of tensile stresses on test specimens while they were immersed in a bath of the acetic acid solution with H_2S bubbling through it. The time required for the specimens to fracture was recorded.

The results of the tests indicate that the steel specimens were more sensitive to stress cracking at higher loadings. Furthermore, each kind of steel tested resisted stress cracking differently; the mild steel was most sensitive, and the sensitivity decreased in the following order: stainless steel, hard steel, and high tension steel. While all the steels were almost equally sensitive to stress cracking under stresses approaching closely to their yield strengths, the differences in resistance to stress cracking were greater, according to the kind of steel, under stresses that were close to their tensile strengths.
[4 figures, 1 table, 5 references] SW

1.82 (1.0113) SUBTIDAL GEODUCKS OF PUGET SOUND, WASHINGTON

Goodwin, C. Lynn
Technical Report No. 13, Washington Dept. of Fisheries, Olympia, Wash. (Aug. 1973), iii + 64 pp.

Surveys performed by divers were initiated to determine the distribution and abundance of clams. Large numbers of geoducks (Panope generosa) were observed by the divers; consequently, in 1969, the law governing the taking of this clam was amended to permit commercial exploitation in addition to taking it for sport.

Analysis of the data indicated five regions of Puget Sound and eastern Strait of Juan de Fuca where the geoduck was abundant. The estimated abundance of the geoduck in all of Puget Sound was 100 million clams. The first year landings of the commercial fishery totaled 400,000 lb, whole wet weight. Large numbers of geoducks were found in three of the regions: Strait of Juan de Fuca around Port Angeles, central Puget Sound including areas close to Everett, Seattle, and Tacoma, and southern Puget Sound around Olympia. One area in the San Juan Islands in the northern Puget Sound region was surveyed; abundance of the geoduck in these waters was meager compared to the other regions in Puget Sound.

Laboratory and field work yielded data that provided information on the population structure and the preferred substrate of the clam (soft mud to sand and gravel). The depth at which they were found varied from intertidal (2 ft or lower) to water 140 ft deep. The growth rate and spawning cycle were investigated, and the preferred temperature salinity relationships were determined.

1.0112 (1.3) A SUMMARY OF PRELIMINARY 1974 FORECASTS FOR ALASKAN SALMON FISHERIES

Seibel, Melvin C. (editor)
Information Leaflet No. 164, Alaska Dept. of Fish and Game, Juneau, AL 99801 (Nov. 15, 1973), 47 pp.

A 15.6 million salmon commercial harvest is projected for Alaskan fisheries in 1974. This estimate indicates a continuation of the pattern of below average salmon catches achieved in 1972-73 and will be the smallest harvest since 1899. Fishermen off southeastern Alaska are expected to harvest 8.8 million salmon or 56% of the total. In the region including Prince William Sound, Cook Inlet, Kodiak, Chignik, and the Southside Peninsula, a harvest of 4.8 million is expected. The projected harvest of the North Side Peninsula, Bristol Bay, and the Arctic-Yukon-Kuskokwim areas is 2.1 million salmon. The species composition of the total catch is anticipated to be: chinook 3%; coho 7%; chum 21%; sockeye 21%; and pink 47%. The lowest harvests will be of pink and sockeye salmon. A preliminary forecast and the method of forecast are given for each region in Alaska, and records of harvest for each species and region are given from 1950 to 1973. SW

1.86 (2.12) (2.1471) (2.1474) OBSERVATIONS ON DISTRIBUTION AND ABUNDANCE OF RED CRABS IN NORFOLK CANYON AND ADJACENT CONTINENTAL SLOPE

Haefner, Paul A., Jr., and John A. Musick (Virginia Institute of Marine Science, Gloucester Point, VA 23062)
Marine Fisheries Review 36, No. 1, 31-34 (Jan. 1974)

The red crab (Geryon quinquedens) occurs at depths from 100 to 1,000 fathoms in the western Atlantic Ocean from Nova Scotia to Cuba and from 200 to 800 fathoms in the Gulf of Mexico. The crab is relatively large, reaching a carapace width of 7 in and weights over 2.5 lb; it is little known and seldom harvested. Other reports indicate that the red crab could be captured by pot or trap gear in depths of 250 to 500 fathoms near Hudson, Block, and Baltimore canyons; and commercial quantities of the crab lie in offshore waters of the United States. A trawl survey was conducted in June 1973 in the Norfolk Canyon which is about on the same latitude as Norfolk, Va. The survey was made to determine distribution and abundance of the red crab. The results of the survey indicate that the red crab ranged in depth from 145 to 870 fathoms but was most abundant from 145 to 280 fathoms. It was more abundant on the adjacent slope area than in the Norfolk Canyon. The crabs that were caught in traps ranged from 3.75 to 6.1 in carapace width; crabs that were caught in the trawls ranged from 1.75 to 6.25 in in width. Most of the crabs were in the hard-shell condition. A few peeler, soft, and papershell crabs were also caught, indicating that molting was occurring. The crabs were segregated in depth according to sex; deeper catches contained more males than females; shallower

1.3 (9.6) AN ANNOTATED BIBLIOGRAPHY OF INTERSPECIFIC HYBRIDIZATION OF SALMONIDAE

Dangel, James R. (College of Fisheries, University of Washington, Seattle, WA 98195)
FAO Fisheries Circular No. 133, Food and Agriculture Organization of the United Nations, Rome, Italy (Sept. 1973), 32 pp. (Distribution restricted)

This bibliography is an attempt to include all known literature, published and unpublished, on hybridization of salmonidae. The whitefishes and graylings are considered by the author to belong to other families and are not included in the bibliography. SW

0.8 (2.12) UNDERWATER KITE DEVICE

Umazume, Kousuke (13-5, 2-chome, Shimorenjaku, Mitakash, Tokyo, Japan) (pat.)
U.S. Patent 3,760,761
Official Gazette of the U.S. Patent Office 914, No. 4, 1243 (Sept. 25, 1973)

This kite device is designed to be towed underwater and to carry various telemetering instruments. FTP

0.8 PLANNING AHEAD TO SAVE ENERGY

Lawler, Frank K. (Food Engineering, Box 2035, Radnor, PA 19089)
Food Engineering 46, No. 1, 67-69 (Jan. 1974)

Positive results from an energy savings program require total committment by management and the members of an organization. The U.S. Dept. of Commerce advocates four steps in managing an energy conserving effort: (1) organize management, (2) conduct energy audits, (3) set energy conservation goals, and (4) launch the energy conservation program.

A partial list of energy saving practices applicable to day-to-day operations in the plant are: (1) Buy preprocessed ingredients and components to save operations and power. (2) Examine every possibility for recovery and use of heat. (3) Use steam traps extensively to save steam and speed processing. (4) Consider use of highly efficient heat-transfer media. (5) Preheat or prechill food products, where possible, to save energy. (6) Insulate hot and cold pipes.

In the area of plant services, look for possible energy savings in such services as heating, lighting, and air-conditioning. Look for use of lighter weight containers and shipping cases. Energy savings in the area of transportation might involve use of common carriers, conversion of tractors to diesel engines, and replacement of standard size cars with compacts. Road fuel energy costs can be reduced by reduction in speed, use of radial steel tires, proper driving practices, etc. Also, telecommunications can save on car trips and fuel. FTP

1.86 (2.12)(2.1471)(2.1474)

catches had more females. The condition of the crabs caught in the traps was better than those taken by trawl. The larger crabs were steamed and eaten; the meat was easily picked and was rated very good to excellent in taste.
[4 illustrations, 7 references] SW

1.89 (1.0117) THE POTENTIALLY COMMERCIAL SPECIES OF OCTOPUS AND SQUID OF FLORIDA, THE GULF OF MEXICO AND THE CARIBBEAN SEA

Voss, Gilbert, Lee Upresko, and Ronald Thomas
Sea Grant Field Guide Series No. 2, University of Miami Sea Grant Program, Miami, Fla. (Oct. 1973), 33 pp.

Octopus and squid are members of the molluscan class Cephalopoda. About 80 species of cephalopods are known on the coasts of Florida, the Gulf of Mexico, and the Caribbean Sea; however, the total number probably exceeds 100. About 12 species are of actual or potential commercial importance. This guide describes means of identifying and gives fisheries information on these 12 species.
[9 figures, 12 illustrations, 23 references] FTP

1.82 (1.0113)

Maps of the sampling locations and geoduck distribution and abundance are included in the report. A table showing locations of sampling, substrate type, and abundance is also given.
[25 figures, 7 tables, 3 references] SW

1.83 (0.6) TREATING ABALONE TO BE CONVERTED TO ABALONE STEAKS

Cole, Ian, and John H. Stroh (Victorian Canning Co. Pty. Ltd.) (pat.)
South African Patent 72 05,304 (Mar. 23, 1973)
Chemical Abstracts 80, No. 3, 13828c (Jan. 21, 1974)

1.953 A REVIEW OF PELAGIC WHALING OPERATIONS IN THE ANTARCTIC BASED ON THE EFFORT AND CATCH DATA IN 10° SQUARES OF LATITUDE AND LONGITUDE

Omura, Hideo (Whales Research Institute, Tokyo, Japan)
Scientific Reports of the Whales Research Institute No. 25, 105-203 (Sept. 1973)
(The Whales Research Institute, 1-3-1, Etchujima, Koto-ku, Tokyo, Japan)

Effort and catch data in 10° squares of latitude and longitude of Antarctic whaling operations derived from the past 35 seasons (1931 to 1971) were examined and analyzed. Greater numbers of baleen whales were taken in the Weddell Sea, the Bouvet area from 0° to 70° East, and the Kerguelen area from 70° East to 170° West than in the Pacific areas of the Antarctic. More than 2 million tons of baleen whales were taken in each of four squares during the 35 seasons, 3 million tons were taken in the Bouvet area, and 1 million tons of whales were taken in the Ross Sea area from 130° East to 170° West.

The 35-season period was subdivided into one prewar (World War II) and three postwar periods and further analyzed. The catch of the baleen whales is shown graphically, by each species, for the 35 seasons, in each square; in addition, the catch of these whales is further subdivided in the four prewar and postwar periods by species: blue whale, humpback whale, fin whale, and sei whale. The appendix of the article contains tables showing catcher days work and catches of the baleen whales by month in each square during 35 seasons.
[16 figures, 18 tables, 10 references] SW

2.1 (2.114) DRAMATIC FUEL SAVINGS POSSIBLE FOR DIESEL BOATS

Anonymous
Technical Release, Marine Advisory Service, Massachusetts Institute of Technology Sea Grant Program, Cambridge, MA 02139 (n.d.), 2 pp.

Most boat owners know that by reducing diesel boat speeds fuel savings are possible. To make this evident a graph (shown on the back of card) can be used for a quick estimation of fuel savings and the time that must be sacrificed at the lower speeds. To read the graph, choose on the bottom line the percentage of design speed to be used and run a perpendicular line through it and the propeller RPM and fuel consumption curves. At the points where the perpendicular line intersects the curves, run lines at right angles (to the perpendicular line) to the lefthand scale and read the percent fuel reduction and RPM. To demonstrate the use of the graph: a boat is designed to make 10 knots top speed (100% design speed); if the boat operates at 8 knots (80% of design speed), the dotted lines on the graph show that 50% less fuel would be consumed at 20% less RPM than operating at 10 knots. For further information on the graph contact Arthur Clifton, Marine Liaison Officer of the Marine Advisory Service of the MIT Sea Grant Program, Cambridge, MA 02139, telephone number: (617)-253-7041. SW

2.06 (0.6) METHOD FOR PRODUCING AN EXPANDED MEAT FOOD PRODUCT AND PRODUCT PRODUCED THEREBY

Van Middlesworth, Peter, Marvin E. Buck, and Bruce R. Seemann; assignors to General Foods Corp., White Plains, N.Y. (pat.)
U.S. Patent 3,745,021
Official Gazette of the United States Patent Office 912, No. 2, 643 (July 10, 1973)

This expanded fresh meat food product is formed by subjecting meat, a farinaceous component, water, and water-soluble materials to elevated temperatures and pressure followed by extrusion to a zone of lower pressure. The product is shelf stable. FTP

2.1121 TRAWL DEVICE

Giovanni, Joseph (101 Tremont St., Boston, Mass.) (pat.)
U.S. Patent 3,774,334
Official Gazette of the United States Patent Office 916, No. 4, 1241 (Nov. 27, 1973)

This trawl device for deep-sea fishing has a board to which a connector bracket is attached. FTP

2.1 TIDE CURRENT TABLES 1974 PACIFIC COAST OF NORTH AMERICA AND ASIA

Anonymous
National Ocean Survey, NOAA, Rockville, MD 20852 (1973), 254 pp. $2.00.

Daily predicted times of slack water and predicted times and velocities of maximum current (flood and ebb) are presented for a number of reference stations. Similar predictions for many other locations may be obtained by applying correction factors, furnished in the tables, to the appropriate reference station. Other tables contain information that is useful in approximating the velocity of a current between slack water and maximum current and for computing the duration of weak current near the time of slack water. SW

2.1122 CONSTANT DEPTH TROLLING DEVICE

Angus, Charles D., and John C. Angus; assignors to Angus Research Corp., Spring Lake, Mich. (pat.)
U.S. Patent 3,749,045
Official Gazette of the United States Patent Office 912, No. 5, 1755-1756 (July 31, 1973)

This trolling device will dive to a predetermined depth at speeds of from 2 to 20 knots; the depth that the device maintains is solely dependent upon the pressure of the surrounding fluid. FTP

2.1122 TROLLING DEVICE (2.147)

Spongberg, Gillis (P.O. Box 533, Rocky Mountain House, Alberta, Canada) (pat.)
U.S. Patent 3,760,762
Official Gazette of the U.S. Patent Office 914, No. 4, 1242-1243 (Sept. 25, 1973)

This device is manipulated from a boat and is designed for trolling close to shore. FTP

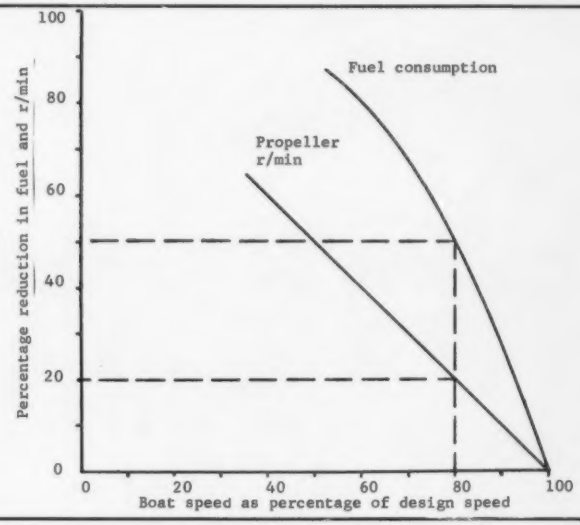
1.89 (1.0115) (1.0116) ASPECTS OF THE DISTRIBUTION AND ABUNDANCE OF THE LONG-FINNED SQUID, LOLIGO PEALEI, BETWEEN CAPE HATTERAS AND GEORGES BANK

Serchuck, Frederic M., and Warren F. Rathjen (National Marine Fisheries Service, NOAA, Woods Hole, MA 02543)
Marine Fisheries Review 36, No. 1, 10-17 (Jan. 1974)

Intensive fishing operations by Japanese, Italian, Spanish, West German, Cuban, and Soviet Union vessels in the waters between Georges Bank and Cape Hatteras have resulted in record-breaking harvests of long-finned squid.

Information gained from semiannual trawl surveys between 1967-1971 was analyzed for variations in distribution and abundance of the long-finned squid. Spring catches were greatest at depths of 111 to 183 m; in the fall, the squid were most abundant at depths of 27 to 110 m. A close relationship was found between the distribution of squid and bottom water temperature. Best catches were made consistently at locations where the temperature was above 10° C. Variations existed between day and night trawl catches; daytime catches were about nine times larger than those made at night. Variations in size of individuals caught were related to season: squid were larger in the spring catches than those in the fall. The relative apparent abundance of squid during the spring averaged 5.2 thousand tons compared to 22.7 thousand tons in the fall. This increase is attributed to recruitment. When the fall estimate was adjusted for inshore populations and the differences in diel (a 24-h period) catch rates, the fall apparent abundance was calculated to average 60,000 tons. These estimates must be considered tentative, and the increased commercial interest in a fishery for long-finned squid necessitates that more research be undertaken to better understand the population dynamics of this species.
[8 figures, 4 tables, 17 references] SW

2.1 (2.114)



2.1123 (1.0119) A VERTICAL LONGLINE FOR RED SNAPPER FISHING

Olsen, David A. (Marine Resources Development Foundation, P.O. Box 387, San German, PR 00753), Arthur E. Dammann, and Don Neal
Marine Fisheries Review 36, No. 1, 7-9 (Jan. 1974)

Because tropical inshore fisheries tend to consist of diverse fish communities, fishing gear must be able to capture a variety of species to be effective. Furthermore, since small boats are used extensively in the tropics for fishing, the gear must be designed for this service. A method of fishing for red snappers and groupers is presented which permits the fisherman to work discontinuous concentrations of these fish more intensively. When a school of red snappers is encountered, the longline is let over the side and 15 to 20 baited hooks, wired with 6-in leaders to longline snaps, are clipped to the line about every fathom of the ¼-in polypropylene line. Knots were tied between hooks to prevent the snaps from bunching. A 5-gal plastic container was used as a float for the surface end, and a 5-lb weight was attached to the bottom end of the line. By setting three sets of gear, one set could be pulled up every 20 min. The short sets are required because of the sharks which destroy gear left in the water too long. The lines are hauled with a standard gasoline-powered fishtrap hauler. If the fishing is successful, the lines are immediately reset with another set of prebaited hooks and snaps. The total cost (excluding the line hauler) is $100. Catches of over 100 lb of snappers and groupers per hour were achieved. This would pay for the gear in 1 hr.
[2 figures, 11 references] SW

2.117 ENGINEERING ASPECTS OF FRACTURE TOUGHNESS: FIBER REINFORCED LAMINATES

Mandell, John F., Frederick J. McGarry, Reiichiro Kashihara, and William O. Bishop
Report No. MITSG 73-9, Massachusetts Institute of Technology, Cambridge, MA 02139 (June 30, 1973), 50 pp.

The applicability of linear elastic fracture mechanics (LEFM) to fracture resistance in fiber reinforced plastics has been investigated by many workers. Results of earlier work by one of the authors indicate that the fracture behavior of a variety of laminates is not uniformly in agreement with the basic concepts of LEFM theory and depends upon the style of reinforcement used. A crack introduced parallel to the fibers of a undirectional composite will propagate colinearly with the original crack, in a brittle fashion consistent with LEFM, while a crack introduced normal to the fibers will usually deflect and propagate parallel to the fibers contrary to the assumptions of LEFM.

Work was performed to continue the investigation of fracture criteria. The materials used in the study were various composite and ply configurations of glass fiber reinforced plastics. The materials were fabricated and machined or molded to various specimen shapes and notched for testing except for tests of tensile strength. The results of the study indicate that a generalized stress concentration criterion may provide a conceptually sound and practical alternative to LEFM, because the mechanism by which the composites of fiber reinforced plastics resist crack extension is by the growth of subcracks which blunt the main crack tip and reduce the concentration of stresses. This mechanism casts doubt on the validity of classical linear plastic fracture mechanics. Additionally, the fracture

2.113 METHOD FOR CONTROL OF MARINE FOULING

Yeiser, Andrew S. (302 Cleveland Dr., Huntington Beach, Calif. (pat.)
U.S. Patent 3,766,032
Official Gazette of the United States Patent Office 915, No. 3, 1020 (Oct. 16,1973)

This patent covers an electrical device and method for eliminating the fouling of boat bottoms by marine growth. FTP

2.148 SUPERSTRUCTURE ICING

De Angelis, Richard M.
Mariners Weather Log 18, No. 1, 1-7 (Jan. 1974) (National Environmental Service, NOAA, Washington, D.C.)

Sinkings caused by superstructure icing are not freak occurrences. Wherever there are high winter winds, and air and sea temperatures are low, icing disasters can occur. There have been many sinkings of fishing vessels caused by icing reported in such areas as the Japanese islands, Greenland, Newfoundland, and Alaska. Fishing trawlers, small merchant ships, and Coast Guard cutters are particularly vulnerable because their freeboard is relatively low. On a small ship, icing can greatly increase the total weight. This elevates the center of gravity of a vessel and decreases the metacentric height. Icing also increases the sail area and heeling moment due to wind action; the trim of a vessel under ice is changed due to the nonuniform distribution of the ice. This hampers steerability and lowers ship speed. A fishing vessel in this condition is in danger of sinking. These conditions are also applicable to stationary structures such as oil drilling platforms. With the tremendous increase in sail area provided by an iced superstructure, a fishing vessel is about as stable as a full-rigged sailing ship in a hurricane.

Ice accretion is a complex process that depends on sea conditions, atmospheric conditions, and the ship's size and behavior. Heavy sea spray, freezing rain, or freezing fog can cause ice buildup. Freezing spray is the most common and dangerous form of icing. It can occur when the air temperature falls below the freezing temperature of seawater (about -2° C) and sea-surface temperatures

2.3 APPARATUS FOR REMOVING THE SKIN FROM VERTEBRATES SUCH AS FISH & ANIMALS

McDonald, Emery L. (1039 Wunderlich Dr., Cupertino, Calif.) (pat.)
U.S. Patent 3,729,775
Official Gazette of the United States Patent Office 910, No. 1, 19-20 (May 1, 1973)

This machine contains pulling rollers which assist in cleaving the skin from the flesh of fish or of animals. FTP

2.3 FISH SCALER

Burns, Lloyd G. (1461 Camille St., Shreveport, La.) (pat.)
U.S. Patent 3,766,605
Official Gazette of the United States Patent Office 915, No. 4, 1180 (Oct. 23, 1973)

The fish scaler has a mesh drum supported for rotation about a stationary tube. Water, at low pressure, passes through the tube into the drum to wash out scales and other debris. FTP

2.148

are below about 5° C. In general, the lower the temperature and the stronger the wind, the more rapid the accumulation of ice. Superstructure icing in the North Atlantic can occur mainly from November through April.

If icing occurs, the buildup rate can indicate the hazard: a rate of 3 in/h can usually be tolerated for a short period; any rate higher than this can quickly create ship stability problems. To keep icing hazards to a minimum the following suggestions are offered: (1) be alert to marine weather forecasts; (2) if icing begins, turn to warm water areas or protected coastal waters; (3) all fishing gear, deck gear, and barrels should be placed below deck; (4) cargo booms should be lowered and fastened; (5) deck machinery and boats should be covered; (6) storm rails should be fastened; (7) all objects that might prevent water drainage from the deck should be removed; (8) the ship should be as watertight as possible; (9) if free board is high enough, all empty bottom tanks containing ballast piping can be filled with seawater; and (10) reliable two-way radio communication should be maintained with shore stations or ships. The author suggests that the major maritime nations should establish ships in the fishing grounds to offer aid and provide warnings of icing conditions. The article contains six charts showing locations, conditions, and time of year icing conditions will occur in the North Atlantic.
[5 figures, 1 table, 15 references] SW

2.1128 OYSTER DREDGE DEVELOPED BY VIMS
(0.8)(2.1478)

Frye, John
National Fisherman 54, No. 10, 2C (Feb. 1974)

In an effort to modernize the private ground oyster fishery, an oyster dredging rig was developed that resembles an hydraulic soft-shell clam dredge. The dredge, in prototype form, uses in combination an hydraulic jet and a mechanical rake. The rake consists of rows of flexible steel tines on two steel cylinders mounted in a steel box called the harvester head; the cylinders are rotated by an underwater hydraulic motor. As the harvester head slides on runners over the bottom at the forward end of an escalator, the rotating tines rake oysters and shells off the bottom, and a horizontal jet of water washes them onto the escalator which conveys them up to the boat. The development work was performed under a contract with the National Marine Fisheries Service and supported on a matching basis by the Virginia Institute of Marine Science (VIMS) and the Virginia Marine Resources Commission. The staff members of VIMS reported that results of field trials of the prototype were encouraging, and that further testing and modification are expected to make the dredge suitable for commercial applications.
[2 photographs] SW

2.117

toughness of fiber reinforced plastics tends to increase with decreasing temperature and increasing strain rate and is insensitive to thickness in many cases. Each of these characteristics is contrary to the behavior of metals. While the laminate fracture toughness is influenced by fiber orientation, fiber volume fraction, and ply stacking arrangement, the properties of the matrix material have little effect. SW

2.113 PROTECTING THE HULLS OF MARINE VESSELS FROM FOULING

Zondek, Klaus (pat.)
U.S. Patent 3,761,334 (Sept. 25, 1973)
Chemical Abstracts 80, No. 3, 11243j (Jan. 21, 1974)

2.3 OPENER FOR CLAM SHELLS AND THE LIKE

Valentino, Joseph V. (1120 Jensen Ave., Mamaroneck, N.Y.) (pat.)
U.S. Patent 3,748,692
Official Gazette of the United States Patent Office 912, No. 5, 1665 (July 31,1973)

The shell of clam, oyster, mussel, or scallop is placed on a support on which a knife is mounted. The knife is maneuvered to sever the seam of the shellfish thus permitting it to be opened. FTP

2.3 SHRIMP FEEDING AND COOKING APPARATUS

Lapeyre, James Martial; assignor to Lathram Corp., New Orleans, La. (pat.)
U.S. Patent 3,744,406
Official Gazette of the United States Patent Office 912, No. 2, 493 (July 10, 1973)

In this shrimp processing apparatus, the feed tank has a frame at the upper discharge end supporting, at an inclination, an endless conveyor. A feed paddle is over the conveyor, and a cooker is located over the conveyor upstream of the feed paddle. FTP

2.9 SYMPOSIUM ON TOXIC PROTEINS, PEPTIDES, AND RELATED SUBSTANCES
(0.35)

Authors and titles listed below
Journal of Agricultural and Food Chemistry 22, No. 1, 1-53 (Jan.-Feb. 1974)

Card A

"Introduction," by Benjamin J. Wilson (School of Medicine, Vanderbilt University, Nashville, TN 37232), p. 1.

Man and domesticated animals tend to avoid naturally occurring toxins of plants and animals. However, some of these toxicants are not readily detectable or recognizable as detrimental, and thus man and animal may unwittingly fall victim to the toxic effects of the substances occurring naturally in the environment. The purpose of this symposium was to present information on the chemical nature and biological aspects of naturally occurring toxic proteins, peptides, and related compounds. Ten articles are presented as follows:

"Toxicities of Methionine and Other Amino Acids," by Norlin J. Benevenga (Depts. of Meat and Animal Science and Nutritional Sciences, University of Wisconsin, Madison, WI 53706), pp. 2-9.

The author discussed the means whereby consumption of excessive amounts of methionine leads to a reduction in growth and tissue damage in animals. The adverse effects of consumption of excessive levels of methionine are probably due to an aberrant metabolism of the methyl group. [8 figures, 5 tables, 44 references]

"Chemistry of the Staphylococcal Enterotoxins," by Merlin S. Bergdoll, I-Y. Huang, and Edward J. Schantz (Food Research Institute, University of Wisconsin, Madison, WI 53706), pp. 9-13.

2.9 SYMPOSIUM ON TOXIC PROTEINS, PEPTIDES, AND RELATED SUBSTANCES
(0.35)

Authors and titles listed below
Journal of Agricultural and Food Chemistry 22, No. 1, 1-53 (Jan.-Feb. 1974)

Card B

"Psycho- and Vasoactive Compounds in Food Substances," by Walter Lovenberg (Experimental Therapeutics Branch, National Heart and Lung Institute, National Institutes of Health, Bethesda, MD 20014), pp. 23-26.

The author discusses (1) physiologically active or toxic amines in substances that are commonly used as foods and (2) foods or plants that are used primarily for their physiologic effects. The substances considered were phenylethylamines (for example, tyramine, epinephrine), indolealkylamines (for example, serotonin, tryptamine), methylxanthines (e.g., caffeine, theobromine), and tropane alkaloids (e.g., atropine, cocaine). [4 figures, 25 references]

"Toxic Proteins Produced by Clostridium botulinum," by Edward J. Schantz and H. Sugiyama (University of Wisconsin, Madison, WI 53706), pp. 26-30.

Highly purified toxins of C. botulinum in acidic solutions behave as simple proteins with molecular weights of 200,000 to 900,000. The toxin complex as found in culture consists of at least two simple proteins: one a neurotoxin of molecular weight of about 150,000, and the other a nontoxic protein of high molecular weight. Information on the chemical, physical, and biological properties of the toxins produced by C. botulinum are discussed. [2 tables, 55 references]

"Allergens," by Joseph R. Spies (Dairy Products Laboratory, ARS, U.S. Dept. of Agriculture, Washington, DC 20250), pp. 30-36.

2.3 APPARATUS FOR DEEP-FAT COOKING

Wright, Edward S., John W. Angstadt, and Gerald L. Garrow; assignors to Blaw-Knox Co., Pittsburgh, Pa. (pat.)
U.S. Patent 3,754,468
Official Gazette of the U.S. Patent Office 913, No. 4, 1093 (Aug. 28, 1973)

This apparatus for deep fat frying of foods has means for introducing and withdrawing cooking oil from a number of points to produce hydraulic effects thus insuring proper contact of the food with the cooking oil. FTP

2.3 FILTERING SYSTEM FOR DEEP FAT COOKING VESSEL

Thomason, Gary (13530 S.W. Aragon St., Beaverton, Oreg.) (pat.)
U.S. Patent 3,759,388
Official Gazette of the U.S. Patent Office 914, No. 3, 910 (Sept. 18, 1973)

This is a two-stage system for continuously filtering hot cooking oil from a deep fat fryer. FTP

2.3 BREADING APPARATUS

Korstvedt, Harald O. (116 Winthrop Rd., Brookline, Mass.) (pat.)
U.S. Patent 3,759,218
Official Gazette of the U.S. Patent Office 914, No. 3, 867 (Sept. 18, 1973)

The apparatus is used for the commercial-scale breading of food products. FTP

2.3 BREADING MACHINE

Johnson, Richard T.; assignor to Sam Stein Assoc. Inc., Sandusky, Ohio (pat.)
U.S. Patent 3,762,363
Official Gazette of the United States Patent Office 915, No. 1, 112 (Oct. 2, 1973)

This machine is used to coat a food product with breading material. FTP

2.9 (0.35)

An allergen is described as "an ordinarily harmless substance in the diet or the environment capable of producing certain diseases as asthma, hay fever, eczema, and gastrointestinal upsets upon contact with a previously sensitized person." This paper is a review of problems involved in studying the chemistry of allergens; the emerging concepts of the chemical nature of allergens and their determinants; significance of work on oil seed allergens; and some current USDA research on the elucidation of the mechanism of the allergic response to ingested milk proteins. [90 references]

"Sea Snake Venoms and Neurotoxins," by Anthony T. Tu (Dept. of Biochemistry, Colorado State University, Fort Collins, CO 80521), pp. 36-43.

Sea snakes occur in tropical and subtropical regions bordering the Indian and Pacific oceans; they are more numerous than terrestrial venomous snakes. Sea snake venom contains neurotoxins more potent than those of terrestrial snakes. The neurotoxins bind the acetylcholine receptor of the neuromuscular junction. The molecular weights of the sea snake neurotoxins are about 6800; they contain eight half-cystines, and some contain methionine. [8 figures, 6 tables, 65 references]

"The Protein Neurotoxins in Scorpion and Elapid Snake Venoms," by Dean D. Watt, Donald B. Babin, and Ronald V. Mlejnek (School of Medicine, Creighton University, Omaha, NE 68178), pp. 43-51.

This report is a review of the chemistry and biological properties of the protein neurotoxins in scorpion and elapid snake venoms. [6 figures, 6 tables, 51 references]

"Procamine and Other Basic Peptides in the Venom of the Honeybee (Apis mellifera)," by M. Larry Peck (American Chemical Society, 1155 Sixteenth St., N.W., Washington, DC 20036), and Rod O'Connor, pp. 51-53.

Honeybee venom contains a complex mixture of substances including basic peptides. It also contains a histamine-terminal peptide, procamine. [5 figures, 31 references] FTP

2.9 (0.35)

Staphylococcal enterotoxins are simple, low molecular weight, fairly heat-resistant proteins. These compounds contain one disulfide bridge that can be reduced without affecting their toxicity or antigenicity. Part of the tyrosyl and methionine residues and the carboxyl and amino groups can be substituted without affecting the toxicity of the molecule. [3 tables, 47 references]

"Vitamin B_6 Antagonists of Natural Origin," by Harold J. Klosterman (Dept. of Biochemistry, North Dakota State University, Fargo, ND 58102), pp. 13-16.

Linatine, a hydrazino peptide found in linseed meal, was found to produce vitamin B_6 deficiency in chickens. D-Cycloserine, a cyclic hydroxylamine derivative (and an antibiotic) produces B_6 deficiencies when administrered at therapeutic levels. Other potential vitamin B_6 antagonists are L-canaline, 4-hydroxymethylphenylhydrazine, and methylhydrazine. Dietary substances that produce a stress on the vitamin B_6 supply or induce neurological disorders that respond to pyridoxine therapy are L-dopa, choline, mimosine, β-cyanoalanine, high level of dietary protein, and thermally processed high protein foods. [51 references]

"Phytohemagglutinins: Their Nutritional Significance," by Irvin E. Liener (Dept. of Biochemistry, University of Minnesota, St. Paul, MN 55101), pp. 17-22.

Phytohemagglutinins (or lectins) have the ability to agglutinate red blood cells; they are widely distributed in the plant kingdom. Lectins are found in those legumes (soybeans, beans, and peas) which are important sources of food. Plant materials containing lectins and intended for human or animal consumption should be suitably processed to destroy the toxic substances. [7 tables, 109 references]

[Continued on card B]

2.8 DRY POWDER FOR GLAZING FOODSTUFFS

Mangiere, Richard John (101 Busteed Dr., Midland Park, N.J.), Charles James Dwyer, and Magdalena Adriana Bressler (pat.)
U.S. Patent 3,769,027
Official Gazette of the United States Patent Office 915, No. 5, 1807 (Oct. 30, 1973)

This edible powder contains a water-soluble starch hydrolyzate, fat, algin, food grade phosphate, food grade source of calcium, and flavoring materials. Foodstuffs, such as meat, are coated with the powder. The powder imparts a glazed appearance to the cooked meat. FTP

3.2 HOME FREEZING OF SEAFOODS

Waters, Melvin E. (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, Pascagoula, MS 39567)
Marine Fisheries Review 36, No. 1, 1-6 (Jan. 1974)

Seafoods selected for home freezing should be fresh and not previously frozen; in addition, the signs indicating freshness including firm flesh, bright eye, shiny skin, mild odor, lack of slime (and other signs appropriate to shellfish) should be observed when making a selection. The seafoods should be prepared for freezing by cutting and cleaning as required and dipping in a solution of cooked starch to exclude air. The packaging material should be impermeable to oxygen and water vapor, and should cling well to the surfaces of the food. The seafood should be wrapped tightly to exclude air. The freezer should be checked to ensure that it is operating normally and then packed with the prepared seafood at the rate of 2 to 3 lb per cubic foot of freezer space. To obtain fast freezing, the packages should be placed in direct contact with the freezer coils, and the storage temperature should be at 0° F or lower. Most home-frozen seafood should not be stored for more than 6 mo and not more than 3 mo for salmon, crab, and shrimp. The packages should be labeled with the date, type of seafood, and number of servings. The first package stored in the freezer should be the first one used; this system will prevent discarding food because the storage time of a package is unknown. Quick thawing is best for frozen seafood but never in hot water. Place the package of frozen seafood in a refrigerator to thaw allowing 18-24 h for a 1-lb package. Some frozen seafood may be cooked without thawing such as breaded, frozen fillets. [5 illustrations, 1 reference] SW

3.2349 DIRECT CONTACT FOOD FREEZER

Barrett, Lee A. (2928 Lothair Way, Michigan City, Ind.) (pat.)
U.S. Patent 3,768,272
Official Gazette of the United States Patent Office 915, No. 5, 1618 (Oct. 30, 1973)

This direct contact freezing device uses a low boiling point, inert refrigerant for the direct contact freezing of comestibles. FTP

3.339 METHOD FOR HEAT PROCESSING FOOD PRODUCTS PACKAGED IN FLEXIBLE CONTAINERS

Katz, Morris H., Powell H. Sams, and Duane M. Riley; assignors to the Pillsbury Co., Minneapolis, Minn. (pat.)
U.S. Patent 3,769,028
Official Gazette of the United States Patent Office 915, No. 5, 1807 (Oct. 30, 1973)

This patent concerns a method for cooking food products packaged in flexible pouches placed between parallel restraining plates to restrict their thickness during heat processing. FTP

3.2342 METHOD FOR FREEZING PRODUCTS BY DIRECT CONTACT WITH AN EVAPORATING FREEZING AGENT

Romijn, Johannes Gerardus (S-Hertogenbosch, Netherlands); assignor to Grasso's Koninklijke Machinenfabrieken N.V. (pat.)
U.S. Patent 3,765,188
Official Gazette of the United States Patent Office 915, No. 3, 815 (Oct. 16, 1973)

Food products are quick frozen by direct contact with an evaporating liquid freezing agent. FTP

3.4 ISOLATION AND IDENTIFICATION OF THE COMPONENTS OF THE TAR OF HICKORY WOOD SMOKE

Hruza, Denis E., Sr., Michel van Praag, and Howard Heinsohn, Jr. (International Flavors and Fragrances, Inc., Union Beach, NJ 07735)
Journal of Agricultural and Food Chemistry 22, No. 1, 123-126 (Jan.-Feb. 1974)

By means of preparative gas chromatography and mass spectrometry, analyses were made of the components of the tar of hickory wood smoke flavor product. The purpose was to obtain pertinent information useful in preparing a synthetic substitute. The compounds identified consisted of 6 aldehydes, 8 ketones, 4 esters, 6 furans, 12 aromatic hydrocarbons, 32 phenols, and 13 acids. Those compounds in the tar reported for the first time are 2-methyl-2-butenoic acid; benzaldehyde; 2-acetylfuran; 2-cyclohexenone; 4-propylguaiacol; 4-methylveratrol; 3-methyl-2-cyclopenten-1-one; 2,3-pentanedione; acetophenone; resorcinol; vinylphenol; 2,6-dimethylphenol; and 2-ethylphenol.
[1 figure, 1 table, 17 references] FTP

3.12 TREATING FOOD WITH POLYPEPTIDE HADDOCK EXTRACT TO PREVENT THE OUTGROWTH OF CLOSTRIDIUM BOTULINUM

Nickerson, John T. R., and Janusz M. Zak; assignors to Massachusetts Institute of Technology, Cambridge, Mass. (pat.)
U.S. Patent 3,765,908
Official Gazette of the United States Patent Office 915, No. 3, 995 (Oct. 16, 1973)

Growth of anaerobic spore-forming bacteria in foods is prevented by adding to the food a mixture of a polypeptide having a molecular weight between 1,100 and 1,400 and then heating the food for a period between 1.5 and 30 min. The polypeptide extract reduces the heating requirements for preventing the growth of the bacteria. FTP

3.330 HEAT PROCESSING OF CANNED FOODSTUFFS

Jowitt, Ronald, and Stuart Nigel Thorne; assignors to National Research Development Corp., London, England (pat.)
U.S. Patent 3,754,467
Official Gazette of the U.S. Patent Office 913, No. 4, 1093 (Aug. 28, 1973)

The cans to be processed are passed downward through a gas-fluidized heating bed so as to subject them to progressively increasing pressure which compensates for the rising internal pressure in the cans as they are heated. FTP

3.4 SALMON PREPARATION

Goodfare Products (Manchester) Ltd. (pat.)
British Patent 1,324,833
Food Technology 28, No. 1, 96 (Jan. 1974)

Sides of smoked salmon are sliced at an acute angle so that they can be assembled without fragmentation wastage. FTP

3.4 SMOKING OF FOOD PRODUCTS

Baker, Harvey O. (Fort Wayne, Ind.), and Johan E. Hoff; assignors to Eckrich, Peter & Sons, Inc. (pat.)
U.S. Patent 3,763,767
Official Gazette of the United States Patent Office 915, No. 2, 458-459 (Oct. 9, 1973)

This apparatus generates a reduced carcinogen content smoke aerosol for use in smoking foods. FTP

6.0 NUCLEOTIDES AND AMINO ACIDS IN SHRIMP BLANCHING WATER
(0.8)

Meyers, Samuel P., and Sunee C. Sonu (Dept. of Food Science, Louisiana State University, Baton Rouge, LA 70803)
Feedstuffs 46, No. 2, 23, 33 (Jan. 14, 1974)

Data are presented on certain nucleotide and amino-acid compounds in the blanch water from shrimp canning operations. The blanch water is the aqueous liquid used for precooking (blanching) the peeled and deveined shrimp prior to packing them into cans. The blanch water may vary from 0% to 10% salt, and the time of the blanch operation may vary from less than 2 to 5 min. In the United States' Gulf of Mexico area alone, it is estimated that about 50-60 million pounds of shrimp are processed each year. With this level of production of shrimp, it appears that the blanch water may be a potential source of protein and other organic materials. Pertinent data are given in the following tables:

Nucleotides in Shrimp Blanching Water

Compound	Blanching water*	
	µmol/l	g/l
Hypoxanthine + inosine	778	0.103
Adenosine 5′-monophosphate	7	0.251
Inosine 5′-monophosphate	1,330	0.462
Adenosine diphosphate	131	0.050
Adenosine triphosphate	9	0.004

* Based on 350-gal tank (salt-free).

6.30 EDIBLE GUMS AND RELATED SUBSTANCES
(9.6)

Lawrence, A. A. (editor)
Published by Noyes Data Corp., Park Ridge, N.J. (1973), xii + 339 pp.

The edible gums and related substances discussed in this book are classified according to their source: natural, biosynthetic, or synthetic. The natural gums are hydrophilic, carbohydrate polymers of high molecular weight and generally composed of monosaccharide units joined by glycosidic bonds. They can be made to dissolve, swell, or disperse in cold water to give viscous solutions. These natural gums are of plant (land and sea) origin; they are found either in the intracellular parts of the plant or as extracellular exudates produced as a result of injury. Biosynthetic gums are polysaccharides produced by bacterial and fungal activity; examples of these preparations are dextran produced by Leuconostoc bacteria and a hydrophilic colloid produced by Xanthomonas compestris. The synthetic gums include carboxymethylcellulose and other cellulose ethers; they are used to replace, or in conjunction with, natural gums. The book covers detailed process information and also includes U.S. patent information. In the coverage given the various gums, three sections are devoted to carrageenan-containing extracts (from the seaweed families Gigartinaceae and Solieriaceae), alginates, and agar. There are three indices in the book: one contains the names of the companies to which the patents are assigned, another lists the inventors, and the third covers the U.S. patent numbers of the products. SW

6.35 CARRAGEENAN

Anonymous
Food Processing 35, No. 1, 71-72 (Jan. 1974)

Carrageenan is an important ingredient in fabricated foods. The gum is used to thicken, stabilize; suspend, and gel a variety of food preparations. In forms used in the United States, carrageenan is accepted as a "Regulated Food Additive." It is extracted from red seaweed as a sulfated polysaccharide rich in galactose and anhydrogalactose hexose units; sulfate content is 20% to 40% (dry weight basis).

Carrageenan is used as the precipitated calcium, potassium, or sodium salt; three types are produced: iota, lambda, and kappa. They are usually blended to produce desired characteristics. The calcium salt is especially applicable in milk-based foods because of its protein complexing properties. Other products that incorporate carrageenan include low sugar jellies, citrus drinks, clear desserts without gelatin, icings, and others. Sodium and potassium salts of carrageenan are usually used in water based products. To maintain the acceptability of carrageenan in manufacturing operations, all significant properties are determined including gel strength, carrageenan content, water viscosity, cold milk viscosity, reactivity with milk protein, solubility in milk and water, ice cream stabilization, particle size, color, moisture, pH, and free from undesirable microorganisms. The article contains information on the applications of carrageenan with levels required, function in the product, and standardized functional properties required for the product. In addition, functional properties and standard test methods are tabulated. A list of companies supplying carrageenan is included. [2 tables] SW

6.0 (0.8)

Amino Acids in Shrimp Blanching Water	
Amino acids	g/l
Lysine	1.39
Histidine	0.22
Arginine	3.10
Aspartic acid	1.80
Threonine	0.62
Serine	0.63
Glutamic acid	3.02
Proline	1.21
Glycine	2.54
Alanine	1.26
Valine	0.92
Methionine	0.63
Isoleucine	0.67
Leucine	1.33
Tyrosine	0.18
Phenylalanine	0.53
Total	20.05

[1 figure, 2 tables] FTP

6.15 (3.237) SOLUBILIZED FISH MUSCLE AS A FOOD BINDING MATERIAL

King, Frederick J. (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, Gloucester, MA 01930, Fred Heiligman, and Eugen Wierbicki
Marine Fisheries Review 36, No. 1, 18-20 (Jan. 1974)

Several different binding materials have been used in preparing food products; the most widely used binding agent for seafoods is usually a modified starch. Comminuted fish flesh has been proposed as a binder material for food products.

A fish binder was prepared by mixing minced fish flesh with an aqueous solution of 3% NaCl and 0.5% sodium tripolyphosphate. Pollock was used most often. During preparation and use of the binder, the temperature was kept as low as possible without freezing to maintain the stability of the muscle protein. Pieces of fresh fish fillets were dipped in the solubilized fish binder and then in Breader (a trade name) and cooked in a deep fat fryer. The adhesiveness of the solubilized fish binder and Breader to the fillets was compared to other fillets covered with a commercial batter mix. The adhesion was measured by U.S. Grade Standards [Inspector's Instructions for Grading Frozen Fried Fish Sticks. U.S. Dept. of the Interior (1963)]. The solubilized fish binder had greater adhesion to surfaces of uncut muscle after vacuum packaging, freezing, cryogenic radappertization, and subsequent storage than the commercial starchbase binder. The viscosity of the solubilized fish binder was lower than a fish paste binder used for comparison, and produced a thinner, more flexible coating on fillet pieces. The adhesiveness of the solubilized fish binder to fillet pieces suggests the possibility that it could be used in food products as a matrix in which pieces of fish flesh are imbedded.
[3 photographs, 11 references] SW

6.36 SOLUBILIZED ALGINATE DRESSINGS

Miller, John Hunter M. (Wallace, Cameron and Co. Ltd.) (pat.)
British Patent 1,328,088 (Sept. 12, 1973)
Chemical Abstracts 80, No. 2, 6974u (Jan. 14, 1974)

6.36 MICROCAPSULES WITH GOOD WATER AND SOLVENT RESISTANCE

Kano, Masafumi, Toshio Ninomiya, and Yoshihiko Nishimura (Dainippon Paint Manufg. Co., Ltd.) (pat.)
Japan. P Kai 73 70,736 (Sept. 25, 1973)
Chemical Abstracts 80, No. 2, 4341m (Jan. 14, 1974)

6.32 DEHYDROGENASES OF BLUE-GREEN ALGAE

Kostlan, N. V., and N. V. Yanovskaya (Inst. Bot. im. Kholodnogo, Kiev, U.S.S.R.)
Chemical Abstracts 80, No. 3, 12220m (Jan. 21, 1974)

6.34 CALCIUM ALGINATE GEL IN FRUIT CULTURED-MILK PRODUCTS

Wood, Francis, and Michael F. Woods (Unilever Ltd.) (pat.)
British Patent 1,328,263 (Aug. 30, 1973)
Chemical Abstracts 80, No. 3, 13826a (Jan. 21, 1974)

6.37 KELP DERIVED FEEDS CONTAINING SEQUESTERED TRACE MINERALS MIXED WITH SULFATE SALTS

Carbonniere, John G.; assignor to Ocean Labs, Inc., San Pedro, Calif. (pat.)
U.S. Patent 3,764,341
Official Gazette of the United States Patent Office 915, No. 3, 600 (Oct. 9, 1973)

Freshly harvested kelp is slurried, and soluble trace mineral sulfates and ethylene diamine dihydriodide are added. The resulting mixture is dehydrated and ground to produce a feed product. FTP

6.54 PREPARATION OF SALMON EGGS

Sugibara, T., C. Yashima, H. Tamura, M. Kawasaki, and S. Shimizu; Riken Vitamin Oil Co. Ltd. (pat.)
U.S. Patent 3,759,718
Food Technology 28, No. 1, 96 (Jan. 1974)

The product "Ikura" is prepared from the eggs of salmon and trout that had been separated by treating the egg masses with protease to decompose the supporting tissue and membrane. FTP

6.50 ANIMAL FOOD FROM RAW WHOLE FISH

Patashnik, Max, and Mark C. Keyes; assignors to the U.S.A. as represented by the Secretary of the Interior (pat.)
U.S. Patent 3,730,728
Official Gazette of the U.S. Patent Office 910, No. 1, 257 (May 1, 1973)

Raw whole fish, kelp, and salt are ground together to form a hamburgerlike mixture. The salt is used to solubilize the myofibrillar protein in the fish. The mixture is then passed through a colloid mill, forming a pastelike emulsion containing dissolved protein, dispersed globules of fat, and dispersed particles of kelp. The protein is coagulated to gel the emulsion into a product suitable for animal food or bait. FTP

9.11 (9.6) ESTUARIES: A PHYSICAL INTRODUCTION

Dyer, K. R.
John Wiley & Sons, New York (1973), xv + 140 pp.

An estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage. If the fresh water inflow exceeds the outflow caused by evaporation, the estuary is called a positive one. Surface salinities are therefore lower within the estuary than in the open sea. In negative estuaries, evaporation exceeds river inflow and precipitation; thus, salinities in the estuary are higher than in the open sea. Most estuaries are positive ones and this book is about them.

After an introductory chapter, a chapter devoted to kinds of estuaries covers drowned river valleys, fjords, and bar-built estuaries. The salinity structures of the estuaries are classified into the following types: salt wedge, fjord, partially mixed, and vertically homogeneous. Sections in the chapter describe classifications using either a stratification parameter or a stratification-circulation diagram. The chapter on flow characteristics covers entrainment, turbulence, and averaging of flows. Entrainment and forms of salt wedges are discussed. In one chapter, examples of estuaries are given: highly stratified estuaries are the Vellar Estuary in India and the Columbia River in the United States. Examples of fjord estuaries are: Silver Bay, Alaska; Hardanger Fjord, Norway; and Alberni Inlet and Knight Inlet, British Columbia, Canada. Partially mixed

6.50 ANIMAL FOOD FROM RAW WHOLE FISH

Patashnik, Max; assignor to the U.S.A. as represented by the Secretary of the Interior (pat.)
U.S. Patent 3,726,689
Official Gazette of the U.S. Patent Office 909, No. 2, 661 (Apr. 10, 1973)

Raw whole fish is ground to a hamburgerlike consistency while salt is added. The salt is used to solubilize the myofibrillar protein. The mixture is then passed through a colloid mill to form a pastelike emulsion. The protein is then coagulated to gel the emulsion into a product suitable for animal food or bait. FTP

9.11 (9.6)

estuaries are: James River, Va. and Mersey Narrows and Southampton Water, England. In the chapter on salt balance, general formulations and other hydrographical equations are shown for various estuaries. In the chapter on dynamic balance, the salt balance in relation to water flow is discussed using various estuaries as examples. A chapter on flushing and pollution gives various methods for predicting flushing time and pollution dispersion. In the last chapter, equations are given for solving the salt balance and dynamical balance equations simultaneously. An author index, subject index, and a reference list are also provided. SW

6.39 [illegible]LE GRASS HARVESTER

Porter, Wellington W. (I.R.D. No. 2, Dublin Rd., Waterloo, N.Y.) (pat.)
U.S. Patent 3,765,156
Official Gazette of the United States Patent Office 915, No. 3, 807 (Oct. 16, 1973)

This invention relates to a device for underwater marine harvesting of turtle grass and the like. FTP

6.54 FISH PROTEIN CONCENTRATE

Schulman, M., E. Pitchon, and C. D. Anderson; General Foods Corp. (pat.)
U.S. Patent 3,759,716
Food Technology 28, No. 1, 96 (Jan. 1974)

Whole chilled or frozen fish are boiled in water to separate the flesh from the bone and to remove some of the oil. The slurry is acidified, comminuted, screened (to remove fine solids), and then extracted with a solvent. FTP

9.11 (9.19) FACTORS AFFECTING THE ASSOCIATION OF FATTY ACIDS WITH MINERAL PARTICLES IN SEA WATER

Meyers, Philip A., and James G. Quinn (Graduate School of Oceanography, University of Rhode Island, Kingston, RI 02881)
Geochimica et Cosmochimica Acta 37, 1745-1759 (1973) (Pergamon Press, New York)

Different types of organic compounds may react in different ways with the same mineral; thus, knowledge of the nature of and capacity for organic-mineral associations would be useful in predicting the fate of an organic compound introduced into sedimentary environments. Laboratory experiments were carried out to determine the effects of certain factors (pH, salinity, temperature, and time) on the incorporation, transport, and release of fatty acids by clay minerals, calcite, and marine sediments. Clay minerals were tested because they constitute an important fraction of terrigenous and marine sediments. Calcite, a carbonate mineral, was used because organic matter may interfere with its solution equilibria in sea water. Fatty acids were selected as the organic compounds because they are of limited solubility in water and have a chemically active functional group. Fourteen fatty acids and methyl palmitate were used in the experiments. The information from this study should be useful in predicting the immediate and long-term fate of these biogenic lipids and of lipoid material (such as petroleum hydrocarbons, chlorinated hydrocarbons, and phthalate esters).

Three times as much heptadecanoic acid was adsorbed by bentonite clay in NaCl solution at 4 ‰ than in water (0 ‰ salinity). From 4 ‰ to 35 ‰ salinity only a minor increase in adsorption occurred. In saline solutions and in sea water,

9.12 ELECTROENCEPHALOGRAPHIC EVIDENCE FOR RETENTION OF OLFACTORY CLUES IN HOMING COHO SALMON

Cooper, Jon C., and Arthur D. Hasler (Laboratory of Limnology, University of Wisconsin, Madison, WI 53706)
Science 183, No. 4122, 336-338 (Jan. 25, 1974)

The researchers used the electroencephalographic (EEG) technique to determine whether coho salmon (Oncorhynchus kisutch) fingerlings can be imprinted by exposure to an artificial chemical (morpholine), and to find out if the fish can retain the information from this chemical until the spawning migration (18 months later). The test group of coho salmon fingerlings was exposed to morpholine at 5×10^{-5} mg/liter for 5 weeks (starting 3 weeks before smolting and ending 2 weeks afterwards). The salmon were then released at the mouth of Oak Creek. During their spawning migration in the fall of the year, morpholine was released into the same stream at a level of 1×10^{-4} mg/liter. The EEG results showed that the olfactory information was retained in the coho salmon for 18 months (the period between smolting and the homeward migration).

In a second group of tests, displaced salmon were tracked past a stream north of the home stream (Oak Creek) by means of an ultrasonic transmitter. The morpholine-imprinted salmon stopped at this stream only when morpholine was released into it; at all other times (when the stream contained no morpholine) the fish continued past the stream. Fish from the group not exposed to morpholine never stopped at this stream when it contained morpholine.
[1 figure, 1 table, 32 references] FTP

9.16 APPARATUS AND METHOD FOR HATCHING FISH

Reynolds, John D. (1093 Kent Rd., N.W., Winston-Salem, N.C.) (pat.)
U.S. Patent 3,738,317
Official Gazette of the United States Patent Office 911, No. 2, 475 (June 12, 1973)

This apparatus is used for hatching fish eggs. It also contains an ultraviolet ray unit to purify the circulating, aerated spring water. FTP

9.16 ARTIFICIAL CULTCH FOR GROWING OYSTERS

Woodbridge, David D., and William R. Garrett; assignors to National Shellfish Processors, Inc., Melbourne, Fla. (pat.)
U.S. Patent 3,738,318
Official Gazette of the United States Patent Office 911, No. 2, 475 (July 12, 1973)

This artificial cultch apparatus for growing oysters has a concrete base for holding the cultch beneath the water in an upright position. Several elongated rods are embedded in the concrete base or are attached to a center frame member, and they have a plurality of cans attached thereto for growing oysters. FTP

9.16 APPARATUS FOR THE PRODUCTION OF ALGAE INCLUDING A FILTERING MEDIUM

Klock, John W. (Tempe, Ariz.); assignor to Research Corp., New York, N.Y. (pat.)
U.S. Patent 3,768,200
Official Gazette of the United States Patent Office 915, No. 5, 1600 (Oct. 30,1973)

Waste liquor is biochemically treated in a tank by continuously circulating it through a filter medium containing bacteria; the remaining liquor is circulated through an algal growth tank. FTP

9.16 FISH FEEDING APPARATUS

Dils, Eugene W., Jr., Larry A. Ward, and Robert A. Ward; assignors to Garon Co., Vancouver, Wash. (pat.)
U.S. Patent 3,786,784 (Jan. 22, 1974)

This conduit-system fish feeding apparatus is designed to dispense the fish feed (usually in pellet form) over different selected areas in the pool. FTP

9.11 (9.19)

adsorption of heptadecanoic acid decreased as the basicity increased. The decrease was linear in the amount of 6% to 9% per pH unit (pH range tested was from 6.5 to 8.5).

When the temperature of the solution containing the fatty acids was raised from 0° to 50° C., adsorption of fatty acid by the clay decreased. This effect may be due to the increased solubility of the fatty acids at higher temperature and to solubilization of fatty acids by indigenous dissolved organic matter in sea water.

Bentonite and kaolinite were the most adsorptive of the mineral particles tested; they were followed in order of decreasing effectiveness by illite, montmorillonite, and calcite.
[3 figures, 6 tables, 24 references] FTP

9.16 COMMERCIAL CATFISH FARMING
(1.92)(9.6)

Lee, Jasper S.
Published by Interstate Printers and Publishers, Inc., Danville, Ill. (1973), 263 pp.

The material in this book covers a broad range of factors which influence the catfish industry. The first three chapters include the history of catfish farming the possibilities in catfish farming, and how to establish a catfish farm. The biology of catfish, the construction of water facilities, and securing and managing water are described in three chapters. There are chapters on nutrition of catfish, production and selection of broodfish and fingerlings, increasing growth, harvesting, and marketing. Other chapters cover controlling diseases, parasites, predators, and other pests. There is a chapter on recreational fee-lake operation. The final chapter describes the methods and forms of catfish processing. In one appendix a chart relates length to weight per thousand fish, number of fish per pound, and weight of each fish. Another appendix gives catfish recipes. There is a bibliography and a subject index. SW

9.16 (1.0154) DEVELOPMENT OF FISH FARMS IN JAPAN

Milne, P. H.
Fishing News International 12, No. 12, 17-20, 23-24 (Dec. 1973)

Aquaculture is an important and growing industry in Japan. In 1951 the total production from aquaculture was 94,000 metric tons; in 1961 production reached 340,000 metric tons. In 1971 the total production from aquaculture was 608,000 metric tons or 6.7% of the total fish catch of 9,130,000 tons. Cultivation of seaweed accounts for half of the production, and the culture of oysters produces 200,000 tons. The remainder of the total production comes mainly from the cultivation of yellowtail, prawn, sea bream, abalone, and octopus. The government of Japan provides fish farmers (who comprise 29,000 out of a total number of 550,000 fishermen) with administrative guidance, promotion subsidies, new techniques, supplies of young cultivable species, and assistance in disease control. The assistance to fish farmers is available from experimental stations situated in many localities in Japan. These stations employ 1,500 biologists, chemists, and technicians; of this staff, 857 are fish culture researchers who, together with 457 advisors in prefectures and the central government, give guidance to fishermen and fish farmers. Fisheries and aquaculture are also investigated at two fisheries universities and 15 fisheries faculties at other universities.

There are five methods of oyster cultivation used in Japan. These are raft, rack, longlines, stick, and sowing. The raft, rack, and longline methods, which are hanging systems of oyster culture, are the most important; the first two predominate in southern Japan, and the longline system is more common on the north

9.17 (9.2) THE ROLE OF SOCIAL SCIENTISTS IN RIVER BASIN PLANNING: A CRITIQUE

Griffith, John (Economics Dept., Division of Business and Industry, Bemidji State College, Bemidji, MN 56601)
Journal of Environmental Systems 3, No. 2, 131-151 (Summer 1973)

In this article the author presents a critique of a river-basin water planning project conducted on an interdisciplinary basis in the Midwest and sponsored by the Federal government. He discusses some of the procedural and substantive deficiencies of the project resulting from the disproportionately small size of the social science component of the research group.
[2 figures, 1 table, 12 references, appendix] FTP

9.17 FISH TAGGING

Beckett, J. S. (Dept. of the Environment, Fisheries and Marine Service, St. Andrews, New Brunswick, Canada)
Underwater Journal and Information Bulletin 5, No. 6, 250-254 (Dec. 1973)

The tagging of fish provides information on migration, growth, and population structure and size. Some of the results of studies of fish movements through tagging indicate that spectacular journeys of thousands of miles occur over a few weeks. Growth can be analyzed if a tagged fish is measured before release and after it is recaptured. Adverse affects of a tag may prevent an individual fish from growing at a normal rate. Tagging is used to determine how many fish inhabit a certain area. If 1,000 fish were tagged and 200 are subsequently recovered among 10,000 fish caught then the total number of fish in that area can be deduced as follows: $1{,}000 \div 200 \times 10{,}000 = 50{,}000$.
This deduction assumes that the tagged fish mix rapidly through the area, behave normally, suffer no losses through death, and do not lose any tags. Since none of these conditions will be fully satisfied, the estimate is likely to be low. The numbers and the rate of recovery of tagged fish allow deductions about the death rate of individuals within a given population. This information is useful in attempts to conserve a fishery by regulating the harvest to prevent depletion of the number required to maintain future harvests. In addition to assisting in determining the numbers of fish in a population, tagging assists in identifying the subgroups in a population of fish. An example of a mixed population of fish

9.19 DETERMINATION OF WATER QUALITY PARAMETERS IN THE MASSACHUSETTS BAY (1970-1973)

Frankel, Sheila L., and Bryan R. Pearce
Report No. MITSG 74-8, Massachusetts Institute of Technology, Cambridge, MA 02139 (Nov. 1973), 342 pp.

The purpose of this study was to obtain a comprehensive understanding of the physical environment of the waters in Massachusetts Bay; emphasis was on the definition of pollution problems and the development of a predictive hydrodynamic model of the water environment. Inputs to such a model require measurements of winds, tide, currents, temperature, salinity, water quality, sediment transport, etc., on a continuous time scale. In this study, measurements were made in the field and samples were taken periodically from Nov. 1970 to Aug. 1973. The report specifies the methods of determination, and all data have been correlated to position and date. Also, trends in the data, specifically spacial distribution, time variance, and temperature dependence are described. According to the authors, all the data support the conclusion that Massachusetts Bay coastal area is a nitrogen limiting system. FTP

9.17

is the spring and autumn spawning herring; both groups are part of the same population until the adults of one group move closer inshore to spawn. Proper fishery management requires information on the numbers in both groups of this population.

Early forms of tags may have been natural scars that enabled naturalists to distinguish salmon during their ascent to spawning areas. Deliberate scarring was one of the earliest techniques of tagging and took such forms as clipping off a small part of a fin or punching a hole in the tail fin. Branding with hot or cold irons is also being performed, but brands tend to fade with age. Each fish must be examined for a brand, but a flag type of tag can easily be seen in a mass of fish. A flag type can be of a variety of shapes such as knotted tubing looped through the flesh, buttons held on by wire, toggle types, or harpoon-shaped objects held on by lines running through muscle and bone. Internal metal tags are used for small meal-and-oil fish and are recovered by magnets. Radio tags have limited use. Sonic tags can be either internal or external. The sonic pulses are usually picked up by a receiver on a boat.

Some results of tagging salmon and tuna are described.

[1 figure] SW

9.16 (1.0154)

coast. The traditional method of sowing the oyster seed is declining because of low productivity and pollution near population centers. The Seto Inland Sea is the center of oyster culture (using the raft method); this area is favored because of the small tidal range of only 80 cm.

Yellowtail (Seriola quinqueradiata) is the most popular finfish for cultivation; 52,000 metric tons were marketed in 1971. A 3-year culture program starting in 1971 has been in progress for the farming of salmon (Oncorhynchus keta). Young salmon in June 1973 have reached a weight of about 1.5 kg; harvesting is expected to begin in 1974 at 2.5 kg. Experiments with rainbow trout acclimatization to seawater aquaculture are continuing. The Kuruma prawn (Penaeus japonicus) has been cultivated for decades, and production of prawn seeds has been increased to 100 million. Most of these prawns are not for farming but are released to the Inland Sea for fisheries conservation. Abalone are raised for restocking in fisheries conservation, but use of heated waste water is being considered for aquaculture of the organism. The use of heated waste water in aquaculture is also being investigated at the sites of nuclear power plants. Covered breeding ponds in which finfish, prawns, or abalones are raised are used to simplify control of the environment. The author suggests that western fish farmers can learn from Japanese experiences in the last decade.

[8 illustrations, 3 references] SW

9.19 APPARATUS FOR CONTROL OF POISON CONCENTRATION IN TOXICITY STUDIES WITH FISH

Abram, F. S. H. (Dept. of the Environment, Stevenage, Hertfordshire, England)
Water Research 7, No. 12, 1875-1879 (Dec. 1973)

One of the major problems in controlling an experimental environment, in laboratory studies of toxicity of water pollutants, is that of maintaining the concentration of the toxic agent at the required level. The author has devised a system for providing a controlled variation in the concentration of poison, for dosing different poisons alternatively, and for dosing a variable mixture of poisons. Such devices have been reported previously, but they operated either on the power furnished by hydrostatic force or electrical motors and valves. The apparatus described in this report is operated pneumatically and therefore avoids the problems of electrical control near wet materials and retains the reliability of pneumatic operation. The system involves the filling and emptying of 500-ml measuring cylinders with water and simultaneously incorporating a quantity of poison from a concentrated stock solution. The apparatus consists essentially of 14 aquaria, each of 40-liter capacity, and each equipped with its own dosing unit. Each dosing unit consists of a 500-ml measuring cylinder with required tubing, valves, and syringes to provide the necessary metering for precise control of concentrations of poison entering the aquarium. The pneumatic system consists of pressurizers, pressure regulators, and valves that control the pneumatic power of the metering system. The apparatus works reliably for long periods with a satisfactory degree of accuracy. The overall concentrations delivered were 99% of the nominal value plus or minus 6%. Diagrams of the apparatus are shown.

[4 figures, 1 table, 8 references] SW

9.17 (1.0146) (1.0147)(9.6) NORTH SEA SCIENCE. NATO NORTH SEA SCIENCE CONFERENCE AVIEMORE, SCOTLAND, 15-20 NOVEMBER 1971

Goldberg, Edward D. (editor)
MIT Press, Cambridge, Mass. (1973), xviii + 500 pp.

The aims of the Conference were (1) to assemble a scientific base which would assist in providing some direction in the management of the North Sea, and (2) to provide a pattern for the integration of information on the resources of regional marine areas especially those which are threatened by man. The North Sea is important because it yields 5% of the world's fish supply and yet constitutes a small part of the world ocean; in addition, it is the source of gas, sand, gravel, and potentially oil. The North Sea is also a dumping ground for the discarded material of society. These activities are in conflict, and management decisions should be made that prevent either unrealistic preservation or careless exploitation. After 6 days of lectures and discussions by scientists at the Conference, recommendations were evolved which, if implemented, could provide a beginning for management of the North Sea. These recommendations point out areas where more information is needed in the fields of physical oceanography, mathematical models, geology, meteorology, biology, chemistry, living resources, and man's activities.

The papers presented to the Conference have been assembled in this book and are in the same fields that the recommendations were classified. Additionally, there are sections on nonliving resources including dumping, and a short series of resource maps. Each paper is concluded with a bibliography, and the whole collection is indexed. The authors and their affiliations are also given. SW

9.19 (9.1) REGIONAL SURVEY OF MARINE BIOTA FOR BIOASSAY STANDARDIZATION OF OIL AND OIL DISPERSANT CHEMICALS

Becker, C. D., J. A. Lichatowich, M. J. Schneider, and J. A. Strand (editors)
API Publication No. 4167, American Petroleum Institute Committee on Environmental Affairs, Washington, D.C. (Apr. 6, 1973), 68 pp.

This survey for the API was conducted by Battelle Memorial Institute, Pacific Northwest Laboratories (Richland, WA 99352) by soliciting recommendations from 75 state and federal laboratories and academic institutions. Members of the Battelle research team then searched the literature for information on which the final selection of species could be made.

The coastal regions surveyed for marine biota were in North America: on the east from the Yucatan Peninsula to Labrador; on the west, from southern Mexico through the United States and Canada to northwestern Alaska. Hawaii was also included. The coastal regions surveyed are: North Atlantic, Middle Atlantic, Chesapeake Bay, South Atlantic, Gulf of Mexico, Pacific Coast, Alaska, and Hawaii.

The purpose of the survey was to list, on a regional level, those commercially valuable organisms potentially vulnerable to the affects of oil and oil-treating-agent mixtures. Specific organisms were selected to serve as regional reference indicators for standardizing bioassay technique and for comparing baseline data derived in routine laboratory toxicity tests. The selection of these species was based on the aquatic habitat in which a treatment agent might be applied; that is, estuary, continental shelf, or open sea. The species that were most sensitive and of economic significance, or those which occupy an important position within the food web of an economically important species were of primary

9.19 (9.6) RESIDUE REVIEWS. RESIDUES OF PESTICIDES AND OTHER CONTAMINANTS IN THE TOTAL ENVIRONMENT VOLUME 48

Gunther, Francis A. (editor)
Springer-Verlag, New York (1973), vii + 168 pp.

Some pest control chemicals and food additive chemicals (necessary in food production, manufacturing, marketing, and storage) persist in foodstuffs. These residues may endanger public health; therefore, they should be under intelligent control and continuing surveillance. The subjects in this review are as follows: "Cadmium Residues in the Environment," by A. L. Page and F. T. Bingham (pp. 1-44); "Pesticide Stability in Cold-Storage Plant Parts, Soils, and Dairy Products, and in Cold-Stored Extractive Solutions," by N. S. Kawar, G. C. de Bastita, and F. A. Gunther (pp. 45-78); "Biological Oxidation and Conjugation of Pesticidal Chemicals," by R. E. Menzer (pp. 79-116); "Regulation of Pesticides in Finland," by Martti Markkula (pp. 117-140); and "The Carcinogenicity of Pesticides," by Wendell W. Kilgore and Ming-yu Li (pp. 141-162). Each article is concluded with a bibliography and there is a subject index that covers all the articles. SW

9.19 (9.17) RHODE ISLAND'S OCEAN SANDS: MANAGEMENT GUIDELINES FOR SAND AND GRAVEL EXTRACTION IN STATE WATERS

Grant, Malcolm J.
Marine Technical Report No. 10, University of Rhode Island, Marine Advisory Service, Narragansett Bay, RI 02882 (1973), 51 pp.

The rising demand for sand and gravel coupled with the decreasing supply from land sources and rising costs of transportation are trends which will cause increasing exploitation of ocean deposits. Extensive and high-quality sand deposits have been found in several areas off the New England coast. While these deposits have not yet been actively exploited commercially, this is expected to increase. For these reasons, management of Rhode Island's offshore and estuarine sand and gravel resources is necessary. To satisfy this requirement, the Legislature of Rhode Island established the Coastal Resources Management Council. This agency was charged to preserve, protect, develop, and restore the coastal resources of the state.

This report is the result of a study that was made to elucidate the problems and conditions which would have to be dealt with in properly managing the expioitation of the coastal sand deposits. The first chapter is devoted to a description of the resource in the sea and on land. The second chapter covers the use conflicts and the impacts of marine sand mining on the natural and human environments. The third chapter is a discussion of the legal considerations. In this chapter, existing legislation of Rhode Island is described in addition to Federal regulatory policy expressed through activities of the U.S. Corps of Engineers and

9.19 (1.952)(8.42) LEAD IN THE CALIFORNIA SEA LION (ZALAPHUS CALIFORNIANUS)

Braham, Howard W. (California Polytechnic State University, San Luis Obispo, CA 93401)
Environmental Pollution 5, No. 4, 253-258 (Dec. 1973)

Other reports indicate that contamination of coastal waters by several heavy metals is widespread, and lead has been listed by the Food and Agriculture Organization [FAO Fisheries Report, No. 99, Suppl. 1 TPME/70/6 (1970)] as the most menacing worldwide inorganic pollutant in the marine environment. Analysis of the various components within marine communities should help to indicate quantitatively the flow of heavy metals through these communities. The California sea lion, which inhabits the waters and islands of the Pacific coast of North America, has been reported to contain high concentrations of persistent pollutants including DDT, mercury, cadmium, and silver. An investigation was performed to determine the concentrations of lead in the sea lion.

Samples of 19 organs and tissues were taken from 6 immature sea lions, 3 males and 3 females. The samples were dried, solubilized with nitric acid and hydrogen peroxide (stepwise); atomic absorption spectrophotometric analyses were conducted on the dissolved samples to determine the levels of lead in each. The results indicate that lead accumulated in higher concentrations in hard tissue, such as bone and teeth, than in soft tissue such as fat and muscle. Furthermore, lead was found to be higher in females than in males. Most of the organs analyzed did not contain levels of lead considered to be toxic. Only the brain samples

9.19 (9.17)

the Dept. of the Interior. Also legislation of the neighboring states of Connecticut and Massachusetts is described. In one appendix, a summary of management recommendations is given: one of these is a requirement forbidding aggregate mining in coastal areas shallower than 50 ft. In another appendix, a summary of the marine hard mineral mining policy of 30 coastal states is presented. This information is in table form and shows the regulatory agency for each state and its term of office; various methods and conditions of obtaining and holding an exploration permit; methods and conditions for obtaining and holding a mining permit; environmental protection required; artificial structures permitted; handling of conflicting uses; and authorizing statutes and regulations. The last appendix contains regulatory proposals that present the best features of pertinent state and federal regulations in standard legal form. The report also contains bibliographies on: environmental considerations; interviews and communications; legal references; the marine resource--sand and gravel; multiple use of the coastal zone; ocean mining; and State of Rhode Island references. MS

9.19 (1.952)(8.42)

contained lead levels that were considered to be a hazard to the sea lion. The tissue samples of intestine also contained high levels of lead. The author concludes that these results are comparable with those found in man and suggests that exposure levels of lead may be similar for terrestrial and coastal environmental communities.
[2 tables, 31 references] SW

9.19 (6.31) BROWN SEAWEED AS AN INDICATOR OF HEAVY METALS IN ESTUARIES IN SOUTHWEST ENGLAND

Bryan, G. W., and L. G. Hummerstone (Plymouth Lab., Plymouth, England)
Chemical Abstracts 80, No. 3, 10881d (Jan. 21, 1974)

9.19 (9.1)

interest in the survey. In addition, as many diverse taxonomic groups as practical were selected. The list shows that many important species are common to more than one region; these widely distributed species are considered to be the most valuable as test organisms in determining the extent of damage to the biota incurred by an oil spill.

The animal and plant organisms are described for each region by name, range, importance, biology, and availability and use. The information on each region is concluded with a bibliography. The names of the contributors and their affiliations are given. MS

9.19 (6.31) GROWTH AND NITROGEN FIXATION BY BLUE-GREEN ALGA, TOLYPOTHRIX TENUIS AS AFFECTED BY PHOSPHORUS CONTENT OF MEDIA

El-Nawawy, Amin S., R. M. Kamal, and M. Abou El-Fadil M. (Agric. Microbiol. Res. Div., Minist. Agric., Cairo, United Arab Republic)
Chemical Abstracts 79, No. 21, 123446p (Nov. 26, 1973)

9.19 (1.953) (1.0112) OCCURRENCE OF DDT RESIDUES IN BELUGA WHALES (DELPHINAPTERUS LEUCAS) FROM THE MACKENZIE DELTA, N.W.T.

Addison, R. F., and P. F. Brodie (Fisheries Research Board of Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 30, No. 11, 1733-1736 (Nov. 1973)

Beluga whales are captured for food by the native people of the Mackenzie Delta. Samples of organ tissues were taken from the whale catch during July 1973 at Shallow Bay and Kugmallit Bay in the Mackenzie Delta. Blubber, muscle, and liver tissue of the Shallow Bay catch and blubber only of the Kugmallit Bay catch were analyzed. These tissues were extracted, evaporated, cleaned up by chromatography on Florisil, and analyzed by techniques of gas-liquid chromatography.

The results indicate that DDT residues were detected in liver and muscle tissue in concentrations of 0.02 and 0.01 p/m (wet weight), respectively, and 2-4 p/m (wet weight) in blubber. Shallow Bay and Kugmallit Bay whale samples of blubber contained similar levels of DDT. These levels of DDT were lower than those reported for beluga whales in Hudson Bay and marine mammals off the coasts of eastern Canada but were higher than those in Pacific gray and sperm whales. No indications of PCBs were observed.

The authors suggest that finding appreciable amounts of DDT in blubber only is unexpected and not understood. The sampled whales are reported not to migrate beyond the Beaufort and Chukchi Seas; the authors conclude that the DDT residues in the whales were accumulated from a diet of shrimp, worms, squids, and small fish. The sources of the DDT in the western Arctic Ocean are surmised to be due to pest control locally, in tributaries of the Mackenzie River system, and airborne from areas of more intensive use.
[1 table, 16 references] SW

9.19 BEHAVIOR OF THE GOLDFISH AS AN EARLY WARNING SYSTEM FOR THE PRESENCE OF POLLUTANTS IN WATER

Salzinger, Kurt (Dept. of Social Sciences, Polytechnic Institute of Brooklyn), Stephen P. Fairhurst, Steven J. Freimark, and F. Dmitri Wolkoff
Journal of Environmental Systems 3, No. 1, 27-40 (Spring 1973)

The purpose of this study was (1) to review selected literature on the effects of pollutants on fish, with special reference to goldfish, in terms of lethal dosages and in terms of behavioral changes and (2) to develop some new data on the behavioral changes in goldfish due to exposure to small concentrations of mercury. In this study goldfish were trained to press a lever when exposed to various schedules of mercury-polluted water. The researchers found that the goldfish showed a reduction in rate of response following exposure to mercury-polluted water, thus suggesting the goldfish as a potential monitor of pollution.
[2 figures, 31 references] FTP

9.2 THE UNCERTAIN FUTURE OF FISHING FAMILIES

Gersuny, Carl, and John J. Poggie, Jr. (University of Rhode Island, Kingston, RI 02881)
Family Coordinator 23, No. 2, 241-244 (Apr. 1973)

To prevent depletion of fish stocks, various agencies concerned are considering measures which will restrict entry into the fisheries previously considered an open-access occupation. Family ties constitute an important aspect in the recruitment of labor in many of our commercial fisheries. If restrictive measures are instituted, problems of blocked succession may arise for some offspring who may wish to follow in their parents footsteps in the fishing fleet. The authors suggest that agencies concerned with problems of the family should plan ahead to seek ways to alleviate the consequences for the families involved in the event that limited entry regulations are imposed.
[7 references] FTP

9.19 POLLUTION, TECHNOLOGY, AND ECONOMIC GROWTH
(9.2)

Gifford, Adam, Jr. (California State University, Northridge, Calif.)
Southern Economic Journal 40, No. 2, 210-215 (Oct. 1973)

Using a neoclassical growth model allowing for pollution and a pollution tax, the author attempts to answer the following questions: (1) Is pollution control possible? (2) What is the effect of pollution control on the rate of growth of output and per capita output? (3) If pollution is to be maintained at reasonable levels with a growing per capita output, what are the constraints on growth of the population?

The model indicates that economic growth is possible with zero growth in the level of pollution (given certain stated assumptions of the model). The control is possible by the use of a growing tax on emissions; when the tax is optimally set, output grows at the same rate as the tax.

Growth rates of output and per capita output are adversely affected by imposition of the tax (the decrease in rate of growth is the cost of cleaning up pollution). The author states that society must balance this cost with the cost of pollution when undertaking a pollution control program. Although growth of per capita output is reduced by the pollution control program, it would probably remain positive.

Within the assumptions of the model, zero population growth is unnecessary, but the rate of population growth must be less than that of pollution-abatement technology when there is zero growth of output technology. Because the model assumes an unlimited supply of natural resources, the continuous growth conclusions

9.2 GLOUCESTER RESOURCE STUDY
(1.0115)

McPherson, Roy Nick (editor)
Report No. MITSG 74-3, Massachusetts Institute of Technology, National Sea Grant Program, Cambridge, MA 02139 (Oct. 1973), x + 180 pp.

This research project was conducted by a multidisciplinary group of students at the Massachusetts Institute of Technology and neighboring universities. They examined, in 1973, Gloucester's interacting economic, technical, political, social, and legal situations. The purpose of the study was to determine how the resources of Gloucester may be better used. The areas covered in the study were fishing, manufacturing, retail trade, tourism, transportation, government, and coastal zone management.

The report is divided into two parts: The first part contains the information base of Gloucester and the second part describes the problem areas and sets forth recommendations. Part I is divided into five chapters dealing with the history of Gloucester, the economic base, transportation, governmental structures, and nongovernmental organizations and legislature. Part II is divided into three chapters dealing with community values, data evaluation and recommendations, and proposal and concluding remarks. The proposals concern solving harbor use problems and solving the transportation situation. FTP

9.19 (9.2)

are applicable only for the relatively near future. The economy will have, eventually, used up enough of its resources to put constraints on its growth. The author indicates that this aspect of the problem will be considered in a later paper. [5 figures, 1 table, 2 references] FTP

9.19 NITRATE CONCENTRATIONS IN GROUND WATER BENEATH A BEEF CATTLE FEEDLOT

Lortimor, J. C., L. N. Meike, L. F. Elliott, and J. R. Ellis (North Plains Branch, Agric. Res. Serv., Lincoln, Nebr.)
Chemical Abstracts 79, No. 18, 107894c (Nov. 5, 1973)

9.2 (9.19) THE INCLUSION OF WASTES IN THE THEORY OF THE FIRM

Ethridge, Don (University of Missouri, Rolla, Mo.)
Journal of Political Economy 81, No. 6, 1430-1441 (Nov.-Dec. 1973)

The author demonstrates that environmental pollution is an economic phenomenon, that waste products are determined by the price system as well as institutional and technological considerations, and that the use of user charges would encourage byproduct recovery as well as other methods of waste reduction. The evidence presented supports the theoretical development in that industrial operations have responded to user charges by reducing their waste discharges, with additional byproduct recovery being one of the means. However, the author indicates, the empirical evidence is far from complete. Further, the various methods of instituting and administering user charges warrants more study as does the cost of administering user charges.

Most earlier economic research in the field of waste control has been directed toward reduction of waste. This paper indicates that firms faced with user charges on wastes discharged would perform some amount of byproduct recovery in the process of reducing wastes. The user charge, the author believes, may be a significant policy tool for inducing recycling as well as for reducing total wastes discharged. [2 figures, 13 references] FTP

9.19 (9.6) POLLUTION CONTROL IN MEAT, POULTRY AND SEAFOOD PROCESSING 1974

Jones, Harold R.
Pollution Technology Review No. 6, published by Noyes Data Corp., Noyes Bldg., Park Ridge, NJ 07656 (1974). Price $36.00, hard cover.

This book contains important data condensed from various government and other sources. One chapter deals specifically with seafood processes and pollutants; other chapters deal with structure of the industry, waste treatment and operation, regulatory considerations, case histories, control of air pollution, pollution reduction and byproduct utilization, and future trends and recommendations. FTP

9.19 RESIDUAL LEVELS OF ORGANOCHLORINE PESTICIDES IN SPANISH SPECIES AND THEIR RELATION WITH THE ENVIRONMENT

Franco, Jose M. (Inst. Quim. Org. Gen., Inst. Invest. Pesq., Vigo, Spain)
Chemical Abstracts 79, No. 21, 122338t (Nov. 26, 1973)

9.12 (1.86) (1.87) AN ANNOTATED KEY TO CRABS AND LOBSTERS (DECAPODA, REPTANTIA) FROM COASTAL WATERS OF THE NORTHWESTERN GULF OF MEXICO

Felder, Darryl L. (Dept. of Zoology and Physiology, Louisiana State University, Baton Rouge, LA 70803)
Publication No. LSU-SG-73-02, Center for Wetland Resources, Louisiana State University, Baton Rouge, La. (Aug. 1973), 102 pp.

This key is for use in identifying crabs and lobsters from the coastal waters of the northwestern Gulf of Mexico.
[12 plates (figures), 82 references] FTP

9.2 SURVEY OF INSTITUTIONAL USERS OF FISH IN CUYAHOGA AND SUMMIT COUNTIES, OHIO

Logar, Cyril M., and Donald F. Mulvihill (Kent State University)
Business Series No. 4, Institute for 21st Century Business, Center for Business and Economic Research, College of Business Administration, Kent State University, Kent, OH 44242 (1973), viii + 74 pp.

This is the third report of a series of four that are to be published on a study of the marketing and physical distribution of fish and fish products in the Midwest, U.S.A. The first report dealing with retailers and the second dealing with wholesalers were published early in 1973. The present report concerns the institutional users of fish and gives the results of a survey made in Cuyahoga and Summit counties in Ohio. The fourth report dealing with consumers will be published later.

The first chapter of this report covers the purpose and organization of the study and gives a summary of the conclusions. The second chapter contains a description of the styles of fishery products and the total pounds of fish purchased by five categories of industrial institutions. Chapter 3 is an explanation of the percentage of the total number of meals served in the institutions that included fish and the markup applied by institutional buyers on the fish they serve. Chapter 4 contains an analysis of the sources of supply, how orders are placed, the frequency of ordering, method of transporting the fish, and delivery time of orders placed. In chapter 5 the authors discuss the trends in sales of fish to

9.3 INTERNATIONAL LAW AND ANCIENT SOURCES: GROTIUS AND SELDEN

Ziskind, Jonathan (University of Louisville, Ky.)
Review of Politics 35, No. 4, 537-559 (Oct. 1973) [Published by the University of Notre Dame, Notre Dame, Ind.]

During the Commercial Revolution, as states became involved in ocean trade, there developed a debate over whether a country could claim and exercise legal sovereignty over the sea. Hugo Grotius, a Dutch jurist, in his work "Mare Liberum" argued against such notion. John Selden, an English lawyer, took the affirmative side of the debate in "Mare Clausum." Debates on the issues intensified as competition for worldwide markets and for access to offshore fishing banks became sharper. The present article is an examination of how Grotius and Selden applied different methodologies and assumptions to their classical, biblical, patristic, and rabbinic sources.
[167 footnotes] FTP

9.2 PRODUCTIVITY GAINS IN U.S. FISHERIES

Bell, Frederick W., and Richard K. Kinoshita (Economic Research Division, National Marine Fisheries Service, NOAA, Washington, DC 20235)
Fishery Bulletin 71, No. 4, 911-919 (Oct. 1973)

Changes in productivity or annual landings per fisherman help to determine the economic welfare of the fishing industry.

Of the 17 fisheries studies, 11 exhibited positive time trends in output (landings) per fisherman. Based upon available data, therefore, it is quite apparent that many sectors of the fishing industry experienced substantial increases in labor productivity over the 1950-69 period. Also, the annual fluctuation of labor productivity varied significantly among the fisheries from the Gulf of Mexico blue crab to the North Atlantic groundfish fisheries.

The construction of a productivity index for all fisheries indicated that, for U.S. fisheries as a whole, labor productivity increased by approximatly 2.5% per year over 1950-69. The growth rate slackened, however, in recent periods.

Of great importance, labor productivity in the U.S. fishing sector grew at a lower rate (i.e., 2.5%) than the entire U.S. economy. However, it was significantly below levels of labor productivity advances in poultry (9.8%) and meat (3.8%), which are fish's chief competitors for the consumer's protein dollar. Preliminary international comparisons revealed that U.S. advances have not been keeping pace with labor productivity advances in other countries for the groundfish and menhaden fisheries.

9.3 STORAGE RETENTION OF NUTRIENTS
(0.7)

Kramer, Amihud (Food Science Program, University of Maryland, College Park, MD 20742)
Food Technology 28, No. 1, 50-51, 53-56, 58, 60 (Jan. 1974)

With nutrition labeling, the nutritive value of every lot of product for every nutrient which is to be declared on the label must be known. Also, the extent to which these nutrients will be retained during the period of the product in the channels of trade must be known.

Some nutrients (total protein content, caloric value, niacin, and sometimes vitamin A) are retained in excellent fashion for months or years in freshly processed foods. The mineral contents should change little during storage of the processed foods; however, their degree of availability may show some change. The nutritive value of proteins is susceptible to damage at high temperatures, and the protein value may decline in some foods stored even a few months at ambient temperature. Thiamine and ascorbic acid are the least stable of the vitamins, and vitamins A and D and riboflavin may show substantial losses during ambient storage.

For those nutrients in foods that show losses during storage, the processor has two alternatives if he wishes to practice nutrition labeling. He may declare on the label a level of the nutrient substantially less than the level existing immediately after the product is processed and packaged. In this way when the product reaches the consumer at some future time, it will still have a residual

9.2

In our detailed study of three selected fisheries, it was generally found that two forces were at work: (a) increasing pressure on the resource base and (b) attempts to increase the fishing effort per worker. Generally, it was found that increases in fishing effort per worker offset the negative impact of rising aggregate fishing effort on the resource, thereby producing a rise in output per fisherman over the period of analysis. The quantitative impact of environmental, technological, and regulatory factors was also identified.
[5 figures, 3 tables, 5 references, 1 appendix] Reprinted in part

9.3 (0.7)

level of the nutrient at or above the declared level. Or, the processor may declare the existing level of the nutrient in the processed product and then store it at a temperature low enough to insure retention of the nutrient.
[8 tables, 49 references] FTP

9.3 THE FISH WAR

Hoge, Thomas A.
American-Legion Magazine 96, No. 1, 4-7, 33-37 (Jan. 1974) (1345 Avenue of the Americas, New York, NY 10019)

The author discusses in popular style the problems involved in the conservation of the world's marine fisheries, the law of the sea, and the upcoming Law-of-the-Sea Conferences.
[8 illustrations] FTP

9.2

institutions. Chapter 6 contains a discussion of the problems encountered by institutions in handling and purchasing fish and a discussion of views on preferences for fresh (chilled) or frozen fish by institutional users. The last chapter contains suggestions of the institutional buyers for improving the sale of chilled and frozen fish and a discussion of the promotional practices of institutional buyers.
[14 tables, 14 references, appendix] FTP

9.2 A FIRST COURSE IN PROBABILITY AND STATISTICS (9.6)

Malik, Henrick J., and Kenneth Mullen (University of Guelph, Ontario, Canada)
Addison-Wesley Publishing Co., Reading, Mass. (1973), xii + 361 pp.

This book emphasizes probability and statistics for second year college students. No previous statistical background is necessary in using this text, and no calculus level mathematics is assumed. However, a mature level of precalculus mathematics would be an asset. There are chapters on various aspects of probability and also distribution, estimation, testing for fit, regression and correlation, variance, and nonparametric statistics. The appendix contains 18 tables covering standards information such as squares and square roots, tables of probabilities, and others. SW

9.6 FISHERY PUBLICATIONS, CALENDAR YEAR 1972: LISTS AND INDEXES

Thorson, Lee C., and Mary Ellen Engett
NOAA Technical Report NMFS CIRC-385, U.S. Dept. of Commerce, NOAA, National Marine Fisheries Service, Seattle, WA 98105 (Nov. 1973), iv + 23 pp. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402)

The following series of fishery publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, in calendar year 1972 are listed numerically (with abstracts) and indexed by author, subject, and geographic area; NOAA Technical Report NMFS CIRC (formerly Circular); Data Report; Fishery Facts; NOAA Technical Report NMFS SSRF; and NOAA Technical Memorandum NMFS.
Authors' abstract

4.60 STABILIZED EDIBLE OIL AND FAT COMPOSITIONS CONTAINING OIL OF TEMPEH

Gyorgy, Paul (201 Curwen Rd., Rosemont, Pa.) (pat.)
U.S. Patent 3,762,933
Official Gazette of the U.S. Patent Office 915, No. 1, 251 (Oct. 9, 1973)

Tempeh, oil of tempeh, or a component of oil of tempeh is useful as an antioxidant in edible fat or oil. FTP

9.19 (6.31) EFFECT OF SULFUR AND PHOSPHORUS ON THE PRODUCTIVITY OF DIFFERENT SPECIES OF BLUE-GREEN ALGAE

Nesterova, E. S. (Inst. Bot. im. Kholodnogo, Kiev, U.S.S.R.)
Chemical Abstracts 80, No. 3, 12296r (Jan. 21, 1974)

9.19 LEVELS OF RADIOACTIVITY IN THE MARINE ENVIRONMENT AND THE DOSE COMMITMENT TO MARINE ORGANISMS

Woodhead, D. S. (Fish Radiobiol. Lab., Lowestoft, England)
Chemical Abstracts 79, No. 25, 143900k (Dec. 24, 1973)

6.54 (2.01) SPOILAGE OF FISH JELLY PRODUCTS. I. SOFTENING SPOILAGE OF FILM-PACKAGED KAMABOKO DUE TO BACILLUS LICHENIFORMIS

Mori, Kazuo, Harumichi Sawada, Osamu Nabetani, Shigeaki Maruo, and Tomoko Hirano (Nippon Shinyaku Co., Ltd., Kyoto, Japan)
Chemical Abstracts 80, No. 3, 13758e (Jan. 21, 1974)

9.19 RADIOECOLOGY OF BENTHIC FISHES OFF OREGON

Pearcy, W. G., and H. A. Vanderploeg (Oregon State Univ., Corvallis, Oreg.)
Chemical Abstracts 79, No. 25, 143898r (Dec. 24, 1973)

9.19 EMERGENCE OF METHEMOGLOBINEMIA IN FISH UNDER THE EFFECT OF SOME HERBICIDES

Komarovskii, F. Ya. (Inst. Hydrobiol., Kiev, U.S.S.R.)
Chemical Abstracts 79, No. 25, 143394y (Dec. 24, 1973)

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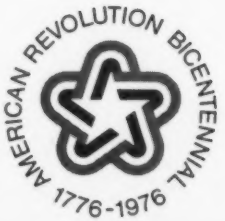
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